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ABSTRACT

Since the publication of the original report, entitled "Fiscal Profile of America's Public Schools, 1981-85, and Associated Energy Implications," the national school revenue picture reveals: (1) a decline in federal aid to education, (2) a decline in state fiscal capacity, (3) a reduction in the state-local portion of public 1 326/827 sector support, (4) a drop in education's portion of the state-local public sector, (5) greater diversity among states in support for education, (6) growth in the states' share of funding public schools to over 50 percent from all sources, and (7) the lowest level of local support in the history of American education. Two dimensions important to an assessment of future financial demands--the demand for schooling and operational needs--are analyzed. The inextricably linked facets of price, energy source and/or mix, and availability are discussed in relation to each fuel source. Projected cost comparisons across fuel sources are presented following the treatment by fuel type. Fuels and their relation to schools are then analyzed. The report concludes that energy conservation is the public schools' only alternative to seeking additional revenues or cutting educational services to students. Ways of financing energy conservation are outlined. The report concludes with recommendations to federal, state, and local policymakers. A selected bibliography is appended. (MLF)

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March 1984

Assistant Secretary, Conservation and
Renewable Energy
Office of State and Local Assistance Programs

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SCHOOL FINANCE AND ENERGY THROUGH THE YEAR 2000

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Assistant Secretary, Conservation and
Renewable Energy
Office of State and Local Assistance Programs
Washington, DC 20585

SCHOOL FINANCE AND ENERGY THROUGH THE YEAR 2000

Prepared by:

Shirley J. Hansen Associates, Inc.
Lake Jackson, Texas 77566

Under Purchase Order No. DE-AP01-83CE64835

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EXECUTIVE SUMMARY

This report addresses the current and projected fiscal condition of America's public schools and the impact energy could have on school finances through 2000.

The Public Schools Fiscal Condition

1. Public school revenues have not kept pace with inflation as measured by a Consumer Price Index ratio. In 1982-1983, the schools had 9.6 percent fewer spendable dollars than they did in 1973. (11-12)*

2. Local support for education is at an all-time low. (12, 18-19)

3. Revenues from states now represent more than 50 percent of the schools' financial resources. Three-fourths of the states cut their budgets in 1982-83. The Department of Education has found 40 percent of the states have "unfavorable" prospects of meeting public school needs through 2000. (12, 15-18)

4. State-local public sector funds provide education a progressively smaller portion of their combined resources. Since the early 1970s, the local schools portion of state-local public sector expenditures has dropped from nearly one-third to less than one-quarter. Demographic trends and changes in school revenue sources suggest this trend will continue. (18, 20)

5. The federal share of educational revenue dropped to 7.4 percent in 1982-1983, its lowest point in 10 years. (12, 15)

6. The financial structure of the public schools mires current revenues in yesterday's economic difficulties. The aftershocks of the 1982 recession were reflected in the 1983-1984 school budgets. (10)

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*The numerals appearing in parentheses after the statements refer to the pages of the text where the topic is treated.

7. The demand for schooling measured by school-age population and by special educational needs such as children in poverty, limited English proficiency and children served as handicapped, is expected to increase through 2000. (26-35)

8. Operational demands, such as deferred maintenance ($25 billion), asbestos removal ($1.4 billion) and population shifts place even further burdens on the education budget. (36-40)

9. Energy cost was the most frequently cited cause of school financial problems according a 1982-1983 poll of school superintendents. Of the survey respondents, 88 percent indicated they currently had major budget/finance problems or felt such problems were likely in the near future. (2, 61)

10. The public schools are the only sector of the economy that cannot pass through higher energy costs by increasing the price of goods, tuition, or service charges. (10)

Energy's Impact on the Schools

11. Electricity is the most expensive form of energy in Btus (source) and is expected to stay that way. By 2000, utility costs are expected to have increased 25 percent/kWh. Per pupil energy costs for the 15 percent of the energy budget that typically goes for lighting and other electrical demands (excluding heating/cooling) are projected to be $26 in 1985, $38 in 1990, and $76 by 2000. (40-52, 61-63)

12. Oil prices per barrel are expected to stay the same or drop slightly through 1985. After 1985, distillates are expected to go up 54 percent and residuals 73 percent by 2000. Per pupil costs for energy for schools with oil-fired boilers are expected to be approximately $130 in 1985, $204 in 1990, and $546 in 2000. Across the nation 19 percent of the schools depend on oil for heating. (43-47, 63-64)

13. Natural Gas is the only major fuel that is expected to increase substantially (6 to 11 percent per annum) in the immediate future. By 2000, natural gas prices

are expected to be 80 percent higher than their 1982 levels. Per pupil costs for energy for schools with gas-fired boilers are projected to be $228 in 1985, $335 in 1990, and reach $876 in 2000. (47-49, 64-65)

Over 60 percent of the nation's schools use natural gas for heating. The urban school systems average an 80 percent reliance on natural gas. In some areas of the country the school's reliance on natural gas reaches 92 percent. States and cities designated as having "unfavorable" education funding prospects by the Department of Education have higher than average dependence on natural gas. (65-70)

14. National average per pupil energy costs are expected to be $184 in 1985, $268 in 1990, and $677 in 2000. These calculations assume 15 percent electrical demand, heating/cooling fuel sources proportional to national percentage of use in public schools, and a 6 percent per annum for inflation. (3, 71)

15. Total energy costs to the public schools would be $11 billion in 1990 and exceed $31 billion in 2000 at today's consumption rate. (71)

16. Conservation remains the cheapest, most environmentally attractive "barrel of oil." A conserved barrel of oil equivalent was $8 in 1983 while a delivered barrel was about $35. It is the public schools only alternative to seeking additional revenues or cutting educational services to students.

    Conservation has proven to be an important energy resource. The Btus needed to produce one dollar GNP fell from 60,000 in 1973 to 48,000 in 1982. The energy consumption in the U.S. decreased by 5 percent between 1973 and 1982 while real GNP increased 18 percent. (55)

17. The total "lag effect" of the 1973-1982 higher energy prices to institutionalize conservation practices is expected to take 37 years and reduce the energy/GNP by 30.5 percent by that time. (56-57)

18. Financing energy conservation is expected to become increasingly difficult for the schools.

Federal energy grants have played an important role in providing technical assistance and augmenting local finances; however, by the end of 1983, they had served only 5 percent of the schools. (73-74)

State legal barriers, lack of understanding by school people, and inconsistent procedures have impeded the effective use of alternative financing. If independent funding sources are to become a broadly based viable school resource, concerted leadership at the national level is needed. (73-81)

America's public schools clearly have, and will continue to have, financial problems. Energy costs are a significant contributor to those problems. Action now, before revenues become more constrained and energy costs escalate more rapidly, can help ameliorate the increasing fiscal difficulties education faces.

TABLE OF CONTENTS

Page

LIST OF TABLES....................................iii

LIST OF FIGURES...................................iv

INTRODUCTION......................................1

THE ECONOMY.......................................4

  Uncertain Times.................................4
  The Rest of the 80s.............................5
  Energy and the Economy..........................5
  A Shadow on the Horizon.........................9

THE PUBLIC SCHOOL.................................10

  Educational Revenues............................11
    Revenue Source Trends.........................13
      Federal Revenues............................13
      State Finances..............................15
      State-Local Finance.........................18
      Local Revenues..............................18
      Private Sector Support......................19
    The Revenue Future............................20
      Demographics................................20
      Resurgence of the Interest in Education.....21
    Disparities in Educational Finance............22
    Declining Financial Support...................25

  Education's Financial Demands...................26
    Demand for Schooling: Population Size.........27
    Demand for Schooling: Educational Need........30
      High School Students........................30
      Poverty.....................................31
      Limited English Proficiency.................31
      Handicapped.................................32
      Instructional Mandates......................32
      Math, Science and Technology Pressures......33
      Summing Up Educational Needs................34
    Operational Demands...........................36
      The Maintenance Gap.........................36
      Asbestos....................................37
      Litigation..................................37

      Population Changes..............................39
      Energy..41

ENERGY PROJECTIONS....................................41

    Economic Changes..................................41
    World Conditions..................................41
    Energy Conservation...............................42
    Improved Technology...............................42
  Scenarios in Energy.................................43
    Oil...43
    Natural Gas.......................................47
    Electricity.......................................49
    Coal..52
    Nuclear Power.....................................53
    Renewable Energy..................................54
    The Best Alternative Energy Source: Conservation..55
      The Higher Price "Lag Effect"...................56
  Cost Comparisons....................................58

ENERGY AND ITS IMPACT ON THE SCHOOLS..................61

  Electricity...61
  Oil...63
  Natural Gas...64
  The Composite Picture...............................70
  School Energy Impact Summary........................72

FINANCING ENERGY CONSERVATION.........................73

  Institutional Conservation Program..................73
  Alternative Financing...............................74
    Alternative Financing Opportunities
      and Cautions....................................75
    Tax-exempt Bonds..................................77
    Revenue Bonds.....................................77
    Municipal Leasing.................................78
    Third Party Project Financing.....................78
    Cost Sharing......................................79
    Shared Savings....................................79
    General Energy Services Contracts.................80

RECOMMENDATIONS.......................................81

SELECTED REFERENCES...................................83

LIST OF TABLES

Tables Page

1. Average per Pupil Energy Costs 3

2. Public Schools Estimated Revenues; Receipts and Revenues By Source 12

3. Changes in School-Age Populations; 1985 to 2000 28

4. Composite Index of Student Educational Need; By State 35

5. World Price of Oil Projections With Inflation At 6 Percent Per Annum 45

6. DOE World Price Projections And Projected Cost of Distillate Btus 46

7. Projected Natural Gas Costs: Industrial Cost Per MCF 48

8. Cost Experiences: Nuclear Vs. Coal 54

9. Fuel Price Summary: Commercial Sector 59

10. Delivered Fuel Price Summary: Commercial Sector 60

11. Per Pupil Electrical Costs As 15 Percent Of Total School Energy Needs 62

12. Per Pupil Energy Cost Projections In Schools With Gas - Fired Boilers And 15 Percent Electrical Demand 65

13. States With Unfavorable Funding Prospects And Percentage of Schools Which Relie On Natural Gas 67

14. Cities With Poor Funding Prospects And Relative Reliance On Natural Gas 68

15. Per Pupil Energy Cost Projection Composite School -- Fuel Sources Proportional To Natural Gas 71

LIST OF FIGURES

Figures Page

1. Texas Oil: The Employment Connection 7

2. State Prospects In Supporting Public Public Education Through 2000 17

3. State Fiscal Capacity; Measured In Per Capita Personal Income, 1981 23

4. State Fiscal Effort 1980-81 24

5. School-Age Population, 1985-2000 29

6. Percentage of Distribution of Civil Cases Involving Students 38

7. Shifts In Student Population By State 39

8. World Oil Price Scenarios: DOE NEPP-1983 44

9. U.S. Coal Production Post-1974 Projections 52

10. U.S. Energy Consumption Per GPN Dollar 55

11. The Lag Effect on Energy Use of Higher Energy Prices Resulting From 1973-1981 Price Increases 57

12. States With Unfavorable Education Funding Prospects and a High Percentage Of Schools Relying On Natural Gas 66

INTRODUCTION

In 1980, the schools of America faced increasing instability in their revenue sources, an uncertain economy, and no let up in the inroads energy was making in school budgets. These conditions prompted a study of education's fiscal condition and the associated energy implications. A report of the study's findings was made to serve school people and other decision makers who govern the schools' revenues. The wide demand and acclaim for the report, "Fiscal Profile of America's Public Schools, 1981-85, and Associated Energy Implications," testified to the need for such information and its value.

Since the original report was issued by Shirley Hansen Associates early in 1981, changes in the economy, school revenues and energy pricing have occurred. The schools are becoming increasingly hard pressed financially. The percentage of local support for education has hit an all-time low, and the schools have become increasingly dependent on state financial support. The states now provide more than 50 percent of the local school districts' revenues.

Education's dependence on state support does not bode well during a time of fiscal ills in the nation's state capitals. Three-fourths of the states cut their budgets in the 1982-1983 biennium. Since the schools' financial resources are always mired in the past, the schools, in 1983, were only beginning to feel the aftermath of the financial reversals that had brought such fiscal shock to the states. An average of one-third, and as much as one half, of states' expenditures go to support education. The implications for the educational revenue picture are obvious.

A recent Congressionally mandated study determined that 40 percent of the states do not have the fiscal capacity to serve educational needs through the year 2000.

Even as revenues become more constrained, education's costs continue to mount. And energy continues to pose the greatest financial problem to the nation's schools. The schools are the only sector of the economy that cannot pass through higher energy costs.

The 1982-83 Member Survey of Opinions and Status of the American Association of School Administrators found 88 percent of the respondents indicated they currently had major budget/finance problems or felt such problems were likely in the near future. Of all factors posed as contributing to their financial problems, the one most frequently cited (82 percent) was "increased costs of fuel for heating/cooling." Energy clearly remains the most volatile of school expenditures.

In spite of the press about dropping oil prices, most school districts have continued to see their energy bills grow. The drop in oil prices has created little direct benefit to the nation's schools, for only 19 percent of them depend on oil for heating. While much of the country took psychological comfort in the softening of the oil market, over 60 percent of the schools continued to pay higher fuel bills. From 1980 to 1982, natural gas prices went up over 30 percent.

Electricity remains the schools' most expensive energy source, climbing 25 percent in the same period. In 1982, electricity was three times as expensive per million Btus (source) as No. 2 oil. From 1982 to the end of the century, electricity costs are expected to climb an additional 25 percent. Electricity, however, is expected to show the least percentage cost increase through 2000.

Oil costs, after a projected soft period through 1985, are expected to climb more rapidly as the years progress -- with No. 2 oil 54 percent higher and Nos. 4, 5, and 6 oil about 73 percent higher by 2000.

The greatest increase is expected to be in the price of natural gas. It is the only major fuel expected to go up significantly in the near future. By 2000, natural gas is expected to be about 80 percent above 1982 costs in real dollars. Over 60 percent of the nation's schools depend on natural gas as their primary heating fuel. The urban school systems average an 80 percent dependency. States and cities identified by the Department of Education as having unfavorable educational funding prospects through 2000 have a higher than average dependency on natural gas. In addition, they are generally in areas requiring higher than average air conditioning -- from utilities that are apt to rely heavily on natural gas.

Using the projected cost increase just cited, assuming 15 percent of the energy budget for electrical needs (excluding electricity for heating/cooling), and projecting an average 6 percent per annum inflation rate, the public schools of America are facing the per pupil energy costs shown in Table 1.

TABLE 1. AVERAGE PER PUPIL ENERGY COSTS
(with 6 percent per annum inflation)

Year	Gas-Fired	Oil-Fired	Composite
1985	$228	$130	$184
1990	335	204	268
2000	876	546	677

Current projections indicate that energy problems will continue to be a major concern for the schools. The costs are expected to escalate more rapidly in the 1990s. Those areas of the country that have the poorest prospects for funding education are expected to incur the greatest energy increases.

The changing financial and energy circumstances within which America's public schools must operate have prompted a careful re-examination of the fiscal conditions the schools may experience in the near future. This report considers conditions impacting the schools at the close of 1983, the degree to which circumstances have changed in the three years since the original report, and identifies the fiscal conditions which the schools are apt to face through 2000.

As stated in the 1981 report, "Historians and economists alike tell us that when we seek to analyze a given situation, we tend to ignore our own history as well as the larger context within which the area under study operates. The institution of public education is at all times a portion of and a product of American society." The premise still holds. It is appropriate, therefore, to consider the national economic picture before turning to the more specific fiscal situation facing the schools.

THE ECONOMY

The economic profile of the United States at the end of the last decade revealed an economy already operating beyond the bounds of its previous stable growth patterns. Economic uneasiness characterized the early 1980s.

Uncertain Times

The shaky economy cited in the 1981 report unfortunately fulfilled its promise of the uneasy times to come. The United States found itself in the grips of what U. S. News and World Report called, "the longest, most vicious spiral of inflation in U.S. history." Interest rates soared to 21 1/2 percent. The Gross National Product (measured in 1972 constant dollars) shrank in 1980 and again in 1982 with only marginal gains in 1981. Business profits by 1982 had dropped from the 1977 level of $114.9 billion to $79.5 billion (in 1977 constant dollars). Not surprisingly, as business declined, unemployment began to climb. By 1983, it had risen from the 1979 level of 5.8 percent to 10.4 percent. Domestic poverty reached the highest level since 1965. In 1982, 34.4 million Americans, or 15 percent of the population, fell below the poverty level.

By mid-1982, the only area of disagreement about the U.S. economy was whether to describe it as a severe recession or regard it as a full-blown depression.

In late 1982, a glimmer of recovery hope, buoyed by dropping interest rates, started a stock market climb that took it to unprecedented heights. More capital through increased stock value, lower interest rates, and cautious hope for a stronger market prompted business to start restoring depleted inventories.

Workers' earnings finally outpaced inflation by mid-1983. Consumers confidence began to climb, reaching an 11-year high by August 1983. The economy appeared to be well on the mend. Unemployment, always a lagging indicator in economic recovery, finally began to drop in the third quarter of 1983. Economic indicators revealed that the recovery was exceeding expectations. Industry Week told its readers in July 1983 to color the 1984 calendar rosy.

The Rest of the 80s

The perils of predicting the future are clear from the record of the recent past. The turmoil and economic shocks of the 1970s have left economic forecasters a little uneasy.

Economic projections are muddied by many factors including the speed and extent of the technological revolution and the country's shift from manufacturing to information/service industries. W. Clyde Helms, president of Occupational Forecasting, has declared the changes in industry and technology in the next five years will bring greater changes than all the years of the industrial revolution.(16)*

Nevertheless, most economists foresee a more stable economy for the rest of the decade. Wharton Econometric Forecasting Associates expects personal income to outpace inflation and project an average 1.7 percent a year growth in disposable income from 1981 to 1991.(31)

Energy and the Economy

The energy traumas of the 1970s, which cast a pall over the early 1980s, no longer seem so awesome. Data Resources, Inc., predicts that gasoline will be in the $2-a-gallon range by 1988, but once adjusted for inflation will actually be less than the 1981 pump price.

The Energy Information Agency reportedly has credited the 1982 recession with 45 percent of the decline in energy consumption. The American Petroleum Institute, on the other hand, attributes 25-29 percent of the energy consumption drop to the recession and credits other factors, primarily conservation, with the reduced energy demand. Whatever the factors, petroleum consumption went down 5 percent, natural gas 8 percent and domestic coal 3.3 percent. Electricity generally declined 2.3 percent -- the first drop since World War II.

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*The numerals in the parentheses in the report refer to a numbered reference in the bibliography. When second numerals appear after a colon, they refer to specific page number(s) in the cited reference.

Reduced oil consumption prompted an international oil price war that resulted in an OPEC price cut of $5 a barrel in March 1983. Economists were quick to enumerate projected benefits to the national economy: a 1 percent drop in interest rates, an 0.8 percent increase in GNP, a savings of $85 per year in energy costs for the average household, a cut of $8 billion in the foreign trade deficit, and a 1 percent drop in the Consumer Price Index -- a total savings of $22-27 billion a year for the United States.

Those who cite the uneasy situation in the Middle East as a factor in energy pricing generally anticipate higher fuel costs. Dr. Eliyahu Kanovsky, chairman of the economic department of Israel's Bar-Ilan University, has suggested that just the opposite effect may be true. Noting that the Iranians nearly doubled their production in 1982, Kanovsky pointed out that a strong interest in support for Iraq in the Iraq-Iran war may cause Saudi Arabia and Kuwait to increase production, which could undermine prices. Thus, increased production on both sides to fund the war could depress the price of oil even further.

As welcome as lower oil prices have been to most Americans, oil producing states such as Louisiana and Texas have not found the news so economically pleasing. For each drop of $1 per barrel of oil, Louisiana's treasury stood to lose an estimated $31 million in revenues while Texas expected the losses to run as high as $40 million.

The impact of falling oil prices on the Texas economy illustrates the negative effect dropping energy prices can have on a geographical region and/or a sector of the economy.

****

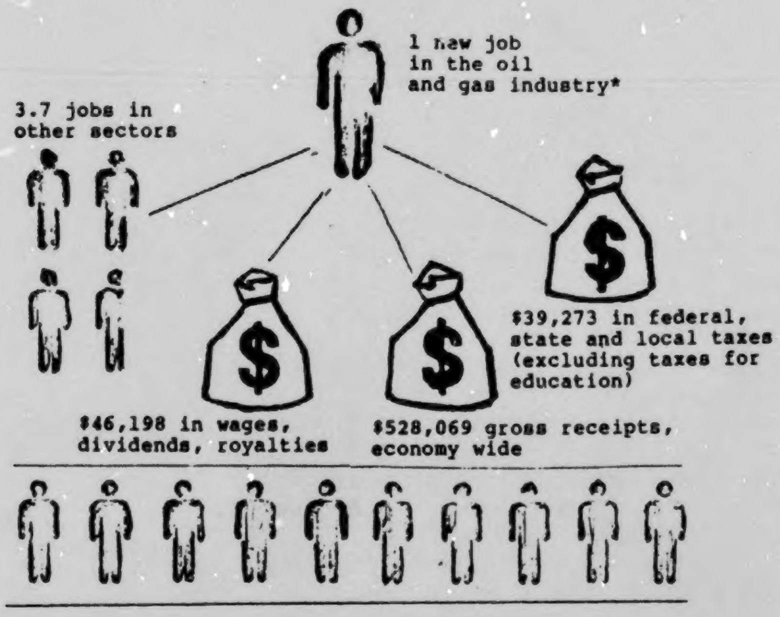
A Case in Point: Texas

Ever since Spindletop saved a sagging Texas agricultural economy more than 80 years ago, Texas has ridden the crest of a one-time geological phenomena. A steady decline in production since

1972 now threatens a fundamental change in the state's economy. For a time, rising oil prices compensated for lower production. Dropping prices paired with lower production have impacted heavily on state revenues.

The ripple effect of dropping prices goes beyond direct revenues. In early 1983, one in every 12 non-farm workers in Texas was employed by the petroleum industry. Figure 1 illustrates the economic implications for one new job in the oil and gas industry.

FIGURE 1. TEXAS OIL: THE EMPLOYMENT CONNECTION



10 NEW JOBS IN THE OIL AND GAS INDUSTRY

- 8.8 jobs in retail trade
- 8.0 jobs in services (including legal services, ical care, accounting, advertising)
- 6.8 job in education
- 2.9 jobs in manufacturing
- 10.5 jobs in all other sectors

SOURCE: Texas Department of Water Resources, Input-Output Model.

*The industry classification is mining. Oil and gas activity composes about 90 percent of the classification in Texas, although it also includes other mining, such as lignite, uranium and sulphur.

Job losses, of course, have the reverse effect. Cutbacks in energy employment mean additional loses in such revenues as sales taxes and increased costs in areas associated with unemployment.

The petroleum industry provides a major share of the state's operating funds. The oil and gas severance taxes alone represented 28.7 percent of all state tax collections in 1982.

Fifty-two percent of the state's expenditures went to fund education in 1983. The relationship is painfully obvious. Declining oil prices jeopardize the state's ability to support education.

****

With phrases such as "oil glut," ringing in their ears, some observers, in 1983, began to ask how long the conservation ethic could be sustained. As a possible early warning sign of a weakening conservation ethic, Americans renewed their love affair with the automobile, the big automobile. In the first six months of 1983, sales figures from Ward's Automobile Reports showed luxury cars increasing their market share to 6.4 percent, up from 5.8 percent for the same period in the preceding year. (19) Chase Econometrics predicted that luxury car sales would double by 1990, with the big car's share of the luxury market growing to 51.8 percent.(20)

This type of behavior and other evidence of increasing energy demands paired with the "most precipitous decline in drilling this industry has ever seen," prompted Ted Eck, chief economist for Standard Oil Company (Indiana) to predict tight oil markets in the months ahead. Eck observed in April 1983 that conditions increasingly pointed to oil prices coming full cycle "back to where we were in the 1970s when we failed to drill as many wells to replace production, and imports went up." (9)

Other economists, however, after carefully establishing caveats such as natural gas decontrol, no Middle East crisis, or the relationship of economic recovery to demand, do not foresee any energy-induced economic disruption in the coming decade reminiscent of the 1970s.

A Shadow on the Horizon

The dark cloud that looms large on the horizon of America's economic recovery is the federal deficit. Concern that the money supply will not be sufficient to feed the federal coffers has caused economists to speculate that money market pressures could spawn higher interest rates. This speculation and a relatively stable U.S. economy caused foreign investors late in 1983 to buy heavily into the U.S. money market, driving the dollar to record levels on the foreign exchange.

The immediate effect of the increased dollar value on the international market was a "silent tariff" on U.S. corporate overseas sales. The January-September 1983 shortfall in trade, fed by a strong dollar and greater demand for imports, totaled $46.6 billion. This nine month drop of $3.9 billion exceeded the preceding twelve months.(21) Implications for multinational companies, balance of trade, domestic employment, and other segments of the economy began to loom large again.

This shortfall and similar economic concerns caused many economists to view soaring federal deficits as an obstacle to recovery. Martin Feldstein, chairman of the President's Council of Economic Advisers warned that the high federal deficits looming in the future raise the risks that economic recovery "will be petering out in a year or two years." (7)

Commenting on the deficit and the future, J. Peter Grace, chairman of the Private Sector Survey of Cost Control observed, "...at some point we're going to hit real trouble. ...I'll bet you that '85 is the moment of truth, regardless of who's elected in 1984." (22:56)

Despite a surprisingly strong economic recovery in 1983, doubts were widespread at year's end. Uncertainty regarding future energy prices and availability in the years ahead still prevailed.

In this uneasy climate, school people must plan the financial future of education and the development of the America's most precious resource, the nation's youth.

THE PUBLIC SCHOOL

The schools are peculiarly and particularly vulnerable to economic uncertainty. Today's school revenues must educate tomorrow's citizenry, and those revenues are determined by yesterday's public attitudes. The very "publicness" of America's public school system remains its strength and its economic weakness.

The phrase, public school, has become such a one-word label that the descriptor public is often overlooked. However, public is the essence of the institution. Its importance in America's education system warrants a reiteration from the 1981 report:

> Our public schools were established by the public through their local and state governments and are funded by the public. Their public purpose is to maintain the culture and develop an educated citizenry essential to an effective democracy. They have a concomitant responsibility to the individual and to the state. One of the public schools' most distinctive services is the societal meshing that works to eradicate class distinctions. This unique service, however, poses a tremendous planning problem for the public schools; for they must take whoever arrives on the doorstep. They have essentially no control over the numbers or variations in their "raw material." Furthermore, it is incumbent on every school from inner city Chicago to the wheat lands of Palouse, Washington to take whatever walks in the door and offer the services necessary to provide a FREE appropriate education -- regardless of the resources available to do it.
>
> The public schools are further hamstrung in any orderly planning by the numbers of outside forces at play mandating exactly what those services will be -- again, without regard to cost.
>
> The public schools do not collect a fee. Nor do they charge a price for the finished product. The public schools do not control the level of funds available to them to provide the required services. They are completely vulnerable. The public schools are the ONLY sector of our economy that cannot pass

through higher costs in fees, charges, or the price of goods.

The public schools are essentially dependent on federal, state and local revenues for financial support. They receive approximately .7 of a percent from non-government sources. With few exceptions, they are increasingly at the mercy of allocators in far-off Washington, D.C., (7.4 percent) and in the state capitals (50.3 percent) for their revenues. Nearly 60 percent of their operating funds are beyond local control. Allocators, subjected to political winds and the vagaries of the process, too often cannot relate to local needs.

EDUCATIONAL REVENUES

In the decade since the 1973-74 embargo years, educational revenues have not kept pace with inflation. Table 2 shows the revenue receipts and percent of revenue by source for 1973-1974 through 1982-1983.

The progressive increase in dollars shown in Table 2 reflects the effects of inflation. The bottom line across the dollar columns represents the 1982-1983 school revenues converted by use of the Consumer Price Index ratio* to 1973 constant dollars for purposes of comparison. It can be seen that total estimated revenues for 1982-1983 provided the schools with fewer spendable dollars than they had available ten years earlier. The total 1973 revenues, $56,869 million divided by the CPI ratio of .4462 equals $127,452 million. America's schools would have had to have $127,452 million in 1982-83 to have had the same spending power as ten years earlier. The total 1982-1983 estimated revenues were $116,273 million -- $11.2 billion short of the same spending level as in 1973. The schools in 1982-83 had 9.6 percent fewer spendable dollars than they did at the time of the 1973 embargo.

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*The Consumer Price Index (CPI) for cities in 1973 was 133. In June 1983, the CPI for cities was 298.1. To convert 1973 dollars to a 1983 value, the 1973 CPI was divided by the 1983 CPI (1973 CPI/1983 CPI = 133/298.1 = .4462). The 1973 dollars were then divided by the CPI ratio of .4462 to determine the 1983 dollars needed to achieve the same spending power as 1973. The problems associated with consumer price indexing are recognized; but this procedure, recommended by the Statistics Branch, U.S. Bureau of Census, Department of Commerce, offers a simple if not precise way to arrive at comparative spendable dollar values. This procedure is consistent with the methodology used in the 1981 report.

TABLE 2. PUBLIC SCHOOL ESTIMATED REVENUES: RECEIPTS AND PERCENTAGES BY SOURCE; 1973-74 to 1982-1983.

	Revenue receipts by source (in millions)				Percent of revenue by source (in millions)		
Year	Federal	State	Local	Total	Federal	State	Local
1973-74	$4,701	$24,299	$27,924	$56,869	8.3	42.7	49.0
1974-75	5,089	27,472	30,486	63,047	8.1	43.6	48.4
1975-76	5,949	30,617	33,463	70,029	8.5	43.7	47.8
1976-77	6,355	32,983	35,965	75,303	8.4	43.8	47.8
1977-78	7,231	36,369	38,545	82,146	8.8	44.3	46.9
1978-79	7,737	41,521	38,507	87,765	8.8	47.3	43.9
1979-80	8,545	46,571	40,245	95,370	9.0	48.8	42.2
1980-81	8,797	50,567	44,770	104,134	8.4	48.6	43.0
1981-82	8,493	54,158	47,622	110,274	7.7	49.1	43.2
1982-83	8,653	58,445	49,175	116,273	7.4	50.3	42.3
1973 dollars at 1983 inflated level				127,452			

Source: National Education Association; excluding 1973 dollar calculations

REVENUE SOURCE TRENDS

A review of the percent of revenue column in Table 2 indicates that in the past decade the trend has been away from local revenues (by 6.7 percent). Since 1980, federal revenues have dropped by 1.6 percent from a high of 9 percent. Even though there was a slight trend away from state support in 1981, the overall pattern reveals a substantial increase (7.6 percent) in relative state support. The pattern of gradual decline at the local level remains consistent.

Federal Revenues

In the six years prior to 1981-82, the annual growth rate of federal aid to education averaged 11.2 percent.(5) From 1981 to 1982, the federal education budget held about constant, falling slightly from $14.8 billion to $14.7 billion. Related support, such as child nutrition, was reduced. Of the 1982-1983 estimated public education budget of $116.3 billion, the federal share dropped to its lowest point in 10 years, 7.4 percent.

Special Issues in Federal Funding. Several social/political funding issues either are or can alter elementary/secondary revenues significantly.

- Impact Aid. Federal installations draw down the available taxable property to support the schools. Impact Aid offers federal support to districts to recompense the school system for the loss of tax support due to parents who live and/or work on federal property. In recent years, changes in federal funding procedures under the program has created considerable controversy and litigation. For example, school systems required to continue educating a large number of children from military bases without commensurate remuneration took action against the federal government.

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A Case in Point:
Fairfax County Public Schools, Virginia

In recent years the Fairfax County Public Schools have annually served about 1500 students living on Fort Belvoir. At the estimated 1982-83 per pupil (ADA) costs of $2,917, educating these children would have cost the school system $4.375 million. (This figure is conservative as the Fairfax County Public Schools' cost per pupil is above the national average.) To the extent that this cost was not supported by the children's parents, the state or the federal government, the burden was shifted to the non-military taxpayers...or programs and services to all students were cut.

A cut in federal reimbursement under Impact Aid prompted the Fairfax school system to notify Fort Belvoir that tuition would be charged to make up the loss. The U.S. Justice Department then sued the school system. The district moved to contest the suit. The broad support for the school system's actions was reflected by the Virginia Legislature when it passed HB 1254, legislation specifically designed to clear the way for the district to challenge the federal government. During a ten week period while the judge took the case under advisement, an additional federal appropriation was made which reinstated the needed funds; so the case became moot.

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- Tuition tax credits, which would allow parents tax credits for school tuition, remains a viable issue. The public school revenue implications of public funds following children to private schools is relatively obvious.

  Implications for school budgets relative to population shifts are not as readily apparent. Schools generally receive state aid based on student attendance. A shift of attendance to private schools through a tax credit incentive would reduce attendance and state aid. Declining enrollments do not commensurately reduce costs. For example, fewer students mean fewer teachers. Reducing teaching staff usually means the teachers with the greatest seniority, and the higher pay, are retained. As a result, teacher costs per pupil go up.

- Block grants merged 33 previously separate federally funded programs under the Education Consolidation and Improvement Act (ECIA), Title V, Subchapter D of the Omnibus Budget Reconciliation Act of 1981 (P.L. 97-35). ECIA's funding mechanism to the states was based on the number of school-age children in each state. The law requires state distribution formulas to consider "children whose education imposed a higher than average cost per child." Once received by the district, however, the law imposed no spending constraints.

  Concern for how specific programs would fare under the block grant procedures was and is the object of much comment in the education community. The Block Grant program, however, fulfilled its promise to decentralize some of the federal involvement in education and place more educational decision making at the discretion of the state and local government. It also has had the effect of further increasing the state role in education finance.

In the past decade, the relative positions of local and state support for public education have done an almost complete reversal. The full significance of the states' dominant role regarding the education purse strings has yet to be fully realized.

State Finance

Greater state activity in educational funding is generally attributed to state efforts to equalize the disparities within states. Equalizing efforts have moved education funding away from the heavy reliance on property tax and the unequal value of taxable property among school districts. As the state share of financing has grown, the proportion of property taxes in state and local tax revenues has declined from 45 percent in 1964 to 31 percent in 1981. (25)

Another reason for the shift to state level funding is the tax limitations and spending caps put on local districts. The "taxpayer revolt," which prompted the tax limitation measures, appeared to be waning as early as 1981, but the repercussions creating greater state support for education have remained.

State support of education remained strong through 1981. The states spent $96.9 billion on all education that year, up 10.2 percent, according to the U.S. Census Bureau. Of that figure, local school districts received $55.7 billion. Another $8.1 billion went to libraries and other educational services. (Note: The Census Bureau figures include federal program money channeled through the state, such as Chapter 1 aid for the disadvantaged and education block grant funds.)

This trend toward more absolute state dollars for education, however, should be viewed in terms of the rate of inflation at the time. In 1981, inflation at 12.4 percent still outpaced the increases in state education spending. In other words, the schools were getting more out of the state pocket, but it bought less. It also should be noted that total state spending went up 13 percent while education support, even with some federal monies included, went up only 10.2 percent.

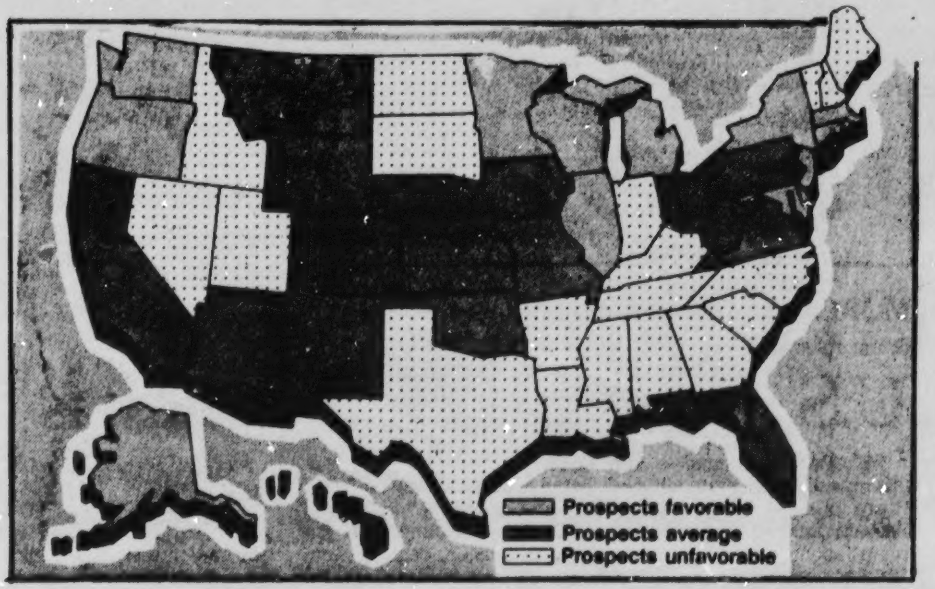
Even so, those were the good times. In 1982, the ability of the states to support education rapidly deteriorated. Indicative of the weakened position of state finance, the National Conference of State Legislatures reported in October of 1982 that twenty-one states had already been forced to cut budgets which had taken effect only the preceding July.

Conditions prompted the Education Commission of States in 1982 to issue a report which stated, "The fiscal condition of the states is not good. The beginning of the eighties may well mark an unprecedented turn-around in the fiscal health of most states, while at the same time an unprecedented disparity among them." (10)

From an $11 billion surplus three years earlier, the 50 states slipped into a $3.8 billion deficit position by early 1983. Since all states are required to maintain balanced budgets, this figure seemed much more awesome to the governors than the much larger federal deficit. The tally prompted Utah's Governor Scott Matheson, chairman of the National Governors Association, to comment, "This is by far the bleakest evaluation of the state of the states we have ever seen. It is very clear to us there is real serious hemorrhaging."

This red ink "hemorrhaging" has profound implications for education. Elementary/secondary expenditures represent one-third of the average state budget. When major cuts in state expenditures must be made, reducing public school funding seems inescapable. The states' red ink of today will bleed into the school budgets of tomorrow. Figure 2 graphically displays the future ability of the various states to pay the school bill.

FIGURE 2. STATE PROSPECTS IN SUPPORTING PUBLIC EDUCATION THROUGH 2000



The data reflected in Figure 2 is drawn from the Congressionally mandated School Finance Project's work. In the first of four reports, "The Prospects for Financing Elementary/Secondary Education in the States," (25) the researchers found that nearly 40 percent of the states face unfavorable prospects for adequately maintaining support for elementary and secondary education through the year 2000.

State-Local Finance

Fiscal constraints facing the states loom large. When state and local finances are considered together, however, a trend of even greater significance to education is revealed: the progressive decline in funds allocated for public education as a portion of the state-local public sector funds. Since 1975, the percentage of state-local funds going to the public sector has remained relatively stable. However, during that period the public schools' share has dropped. In the early 1970s, local schools received nearly 30 percent of state-local expenditures. By 1975, it was down to 27 percent and by 1981, it had fallen below 25 percent. During the same period, the proportion of state-local public sector funds going to health, hospitals and welfare virtually equalled the decline in education's share.(25:i)

Local Revenues

The percentage of educational revenues from local sources is the lowest it has ever been in the country's history.

As shown in Table 2, the proportion of local support for education climbed slightly in 1980-81, but in 1982-83, it dropped to a new low of 42.3 percent. As noted earlier, the shift away from local support can be attributed primarily to state attempts to equalize per pupil revenues among the districts in a state and to adjust for local tax limitations prompted by the tax revolt.

The "taxpayer revolt," as described earlier, appeared to be waning by the early 1980s. Property taxes were again climbing. From a 2.2 percent drop in 1979, property-tax revenues rose by 5.5 percent in 1980. Taxes from real state and personal property increased 9.5 percent in 1981.

Despite this increase in local property tax, the schools' share of local support and the combined state and local public sector support was shrinking. Property taxes were coming back but education was not recovering its previous share of this revenue. The traditional local support for schools, the property tax, had eroded and other interests were successfully competing for the local dollar.

The trend away from local support and primarily away from property taxes has made education even more vulnerable in an uncertain economy. The increased reliance on income tax to support the schools has tied their well-being more to vacillating employment and less to the relatively stable property tax.

Private Sector Support

A relatively small, but important, funding source has increasing significance to education. Spurred by the Reagan Administration's Private Sector Initiatives program and a keen interest in successful education practices by the business-industry community, voluntary contributions to the schools have grown. The portion of the school budget from this source has climbed to 0.7 percent. This, of course, does not fully address the value of volunteers in the schools.

Under various labels, such as Business-Education Partnerships or Adopt-a-School, business has exercised a renewed interest in education. Volunteerism has reached a new high and become an important part of education's resources.

As critical as this monetary support and current participation is in meeting today's educational needs, the move to broaden the public schools' support base may be the greatest benefit to education's financial planners of the 1990s.

THE REVENUE FUTURE

Future public spending patterns are always difficult to predict. Based on past trends and current economic conditions, the following projections regarding educational financing seem likely:

- Local schools are apt to become increasingly dependent on state financial assistance.
- In the face of state fiscal problems, the absolute dollars available to education will tend to fall or at least not keep pace with inflation.
- Public sector funds may decline as a portion of state budgets.
- The schools are not expected to recover their previous share of the state-local public sector pie. In fact, the trend suggests education will not maintain its present status and further proportional losses are likely.

These statements are clouded with uncertainties because they are predicated on the hazardous process of making assumptions regarding the future behavior of individuals and governmental bodies. A brief examination of two major countervailing forces -- (1) changing demographics and (2) the resurgence of an interest in education -- will help illustrate the problem of accurately predicting future revenue patterns.

Demographics

Through the year 2000, the school-age population is expected to remain small relative to the total population. The proportion of parents of school-age children, traditionally the core of community support for the schools, will be similarly small.

Meanwhile the adult population over 65 is expected to maintain its continued, often rapid, growth. This increase is apt to create a greater demand for public services in direct competition to education for the public sector dollar. At the same time, the elderly (over 65) historically have been the least supportive age group of public education. The graying of America could have a major impact on educational revenues available as a portion of the public purse.

Resurgence of Interest in Education

The Reagan Administration's leadership in examining public education placed the institution's needs on the front page and in the public conscience. Most notably, the report, *A Nation at Risk: The Imperative for Educational Reform*, from the National Commission on Excellence in Education highlighted education's problems and its vital role in American society.

This interest may translate itself into increased state legislative appropriations for education and into more partnerships between business and education. Two bright spots in a rather bleak state education finance picture help support this contention.

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Cases in Point: Bright Spots in State Educational Finance

Mississippi

Long plagued with a last place designation in the educational ranking of the states, Mississippi took action in 1983 to upgrade its educational program. The Mississippi Legislature's appropriation was designed to provide free statewide kindergartens for the first time, a 10 percent teacher pay increase, and stronger compulsory attendance laws. The measure also stiffened public school accreditation standards and teacher certification standards.

California

> In a strong move to heal the fiscal wounds to education from Proposition 13, California increased elementary-secondary appropriations by $800 million in 1983. As part of a public school reform measure (Hughes-Hart Act), the law had some 80 changes to accompany the new funds. Included in the act were incentives to school districts to extend the school year and the school day, provisions to raise teachers' salaries over three years to an annual minimum of $18,000 adjusted for inflation, administrative training programs and changes related to graduation requirements, curricula, special programs, and school facilities.

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The depth and duration of the renewed interest in education are critical unknowns. The extent to which it will manifest itself in direct financial support is uncertain. Front-page issues are historically transient. If just these two countervailing forces were used to project future educational revenues, the future would be relatively bleak; for it seems reasonable to surmise that people will be old a lot longer than they'll be interested in education. In the context of assessing educational revenues through the year 2000, the resurgent awareness of educational need is likely to be short-term while the demographic forces will persist.

DISPARITIES IN EDUCATIONAL FINANCING

Through any attempt to create a national profile of the public school fiscal condition runs the danger of suggesting the situation is typical for all school systems. National averages provide reference points and indicate broad trends; they do not necessarily represent specific school situations. In fact at the close of 1983, the disparities among districts within states remain great and the disparities among the states were growing.

Two factors, fiscal capacity and fiscal effort, account for 65-80 percent of the schools' fiscal diversity among states. The two figures presented below and on the following page help emphasize the divergence in state financing patterns. Figure 3 portrays the difference in fiscal capacity by state measured in per capita personal income. (25:44). Figure 4 shows the states' fiscal support for education characterized as high, medium, or low educational effort (25:46).

The pattern of federal aid to education through the states, which used to have a partly mitigating effect, now inadvertently tends to increase the differences among states.

FIGURE 3. STATE FISCAL CAPACITY; MEASURED IN PER CAPITA PERSONAL INCOME, 1981

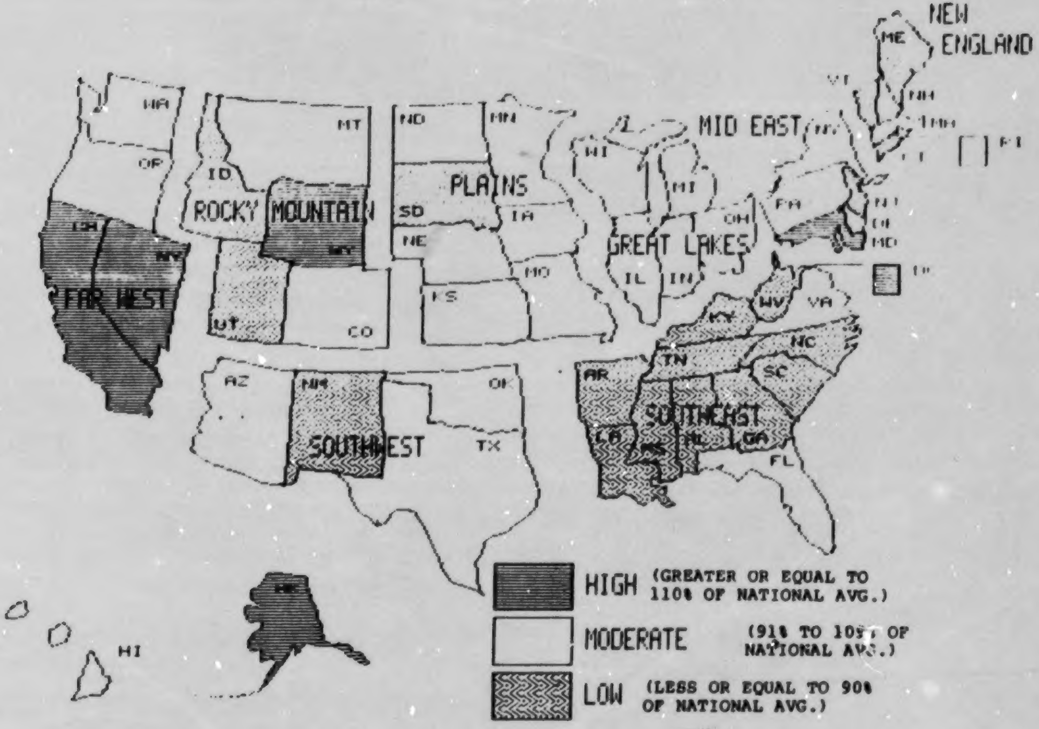
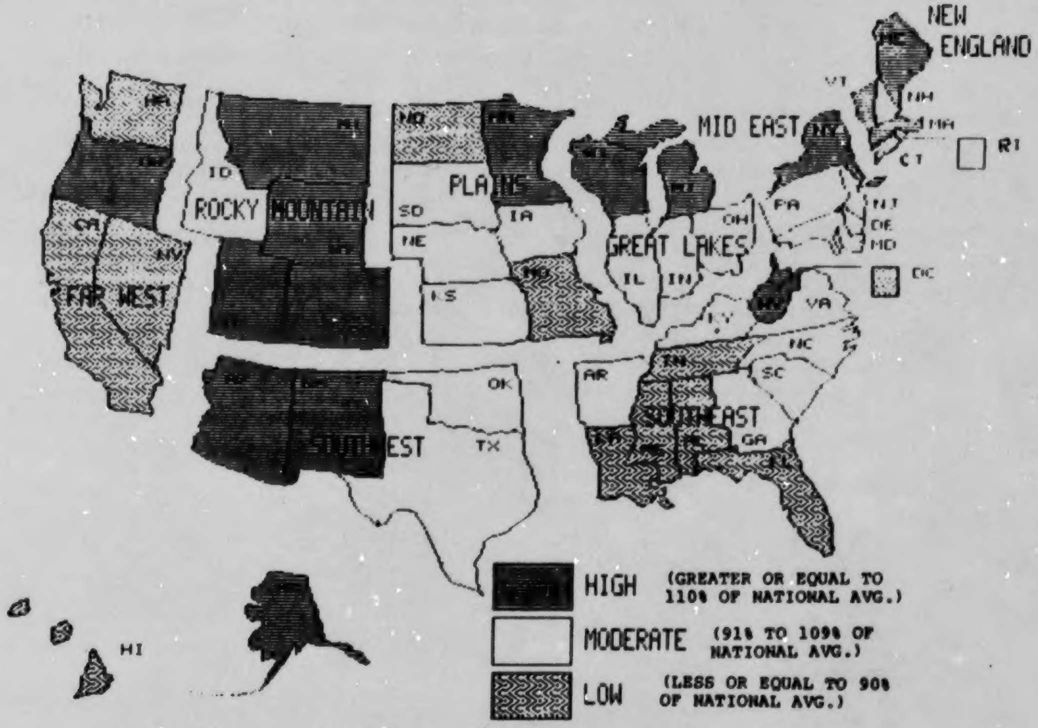


FIGURE 4. STATE FISCAL EFFORT, 1980-81



In summary, the national school revenue picture reveals:

- a decline in federal aid to education,
- a decline in state fiscal capacity,
- a reduction in the state-local portion of public sector support,
- a drop in education's portion of the state-local public sector,

- greater diversity among states in support for education,
- growth in the states' share of funding public schools to over 50 percent from all sources, and
- the lowest level of local support in the history of American education.

DECLINING FINANCIAL SUPPORT

Whatever the source, the bottom line is still clear: the schools have not kept pace with inflation since 1973. The CPI has grown 124 percent in that time; the school budget 104 percent. The nation's school-age population is expected to increase by 5.3 percent in the last half of the 1980s and increase another 12.2 percent in the 1990s. The CPI ratio applied to the total 1973-74 school revenues of $56,869 indicates a 1982-83 budget of $127.5 billion would be needed just to maintain the same level of spendable dollars. The 1982-83 budget was estimated at $116.3 billion, over $11 billion below the maintenance level.

School finance theorists have cited many reasons for declining financial support for the schools. While the relative emphasis has changed over time and by the particular analyst, the reasons tend to remain consistent and viable. The following reasons represent some of the more frequently voiced observations:

1. Tax limitations have capped school spending increases or capped property taxes, the primary source of local revenue.
2. Reduced reliance on property tax in the aftermath of Serrano vs. Priest has not been recovered in other tax bases.
3. Schools must compete for local revenues, particularly in the cities, with other public sector needs.

4. The proportion of adults with school-age children has declined, resulting in a smaller core constituency; and, conversely, the proportion of adults over 65 has grown.

5. Declining enrollments have induced cost containment arguments. State aid based on attendance figures is lower..

6. The financial base for urban schools is diminishing; generating revenues becomes increasingly difficult in the big cities.

7. Public support for education has declined. Reasons often cited are:

   a. drops in student achievement,
   b. disciplinary problems,
   c. collective bargaining among education employees,
   d. switched allegiance to private education -- sometimes following federal and/or court intervention in public schools, and
   e. the opportunity for a tax weary public to say "No!!" to something in the voting booth.

Whatever the reasons for the level of support or the lack of support for education, the schools' fiscal condition can best be assessed by weighing the revenue situation against the financial demands.

EDUCATION'S FINANCIAL DEMANDS

Two dimensions are important to an assessment of future financial demands on education. The first is the demand for schooling--the size of the population to be educated and the special educational needs that population is apt to have. The other, and related, dimension is operational needs. These include the costs of providing and maintaining educational facilities, furnishing energy, transporting students, handling litigation, and meeting federal and state mandates.

THE DEMAND FOR SCHOOLING: POPULATION SIZE

By the late 1980s, the term declining enrollment will have faded into history in most states. Nationally, the school-age population is expected to increase 5.3 percent from 1985 to 1990 and another 12.2 percent from 1990 to 2000. By the end of the century, the number of children in school is expected to be 18.2 percent greater than in 1985.

The projected growth patterns are, of course, uneven. In addition to a projected absolute growth in school-age children for the nation as a whole, shifting populations will continue to account for growth (and decline) in certain states. Migration to the West and Southwest is expected to continue. With the exception of Mississippi, where high growth is anticipated, the South is expected to level off to more moderate growth. States in southern New England, Mideast, and the Great Lakes are expected to show marginal growth or continued decline. Anticipated changes in school-age populations from 1985 to 2000 are presented in Table 3 and graphically portrayed in Figure 5.

The timing and the rate of increase will differ among states and among districts within a state. The percentage of anticipated growth for different time frames depicted in the first two columns of Table 3 help highlight this expected unevenness.

The direct instructional costs related to the size of the school-age population is the single most important factor in calculating financial demand. Generally, more students place greater financial demands on a school district than any other factor.

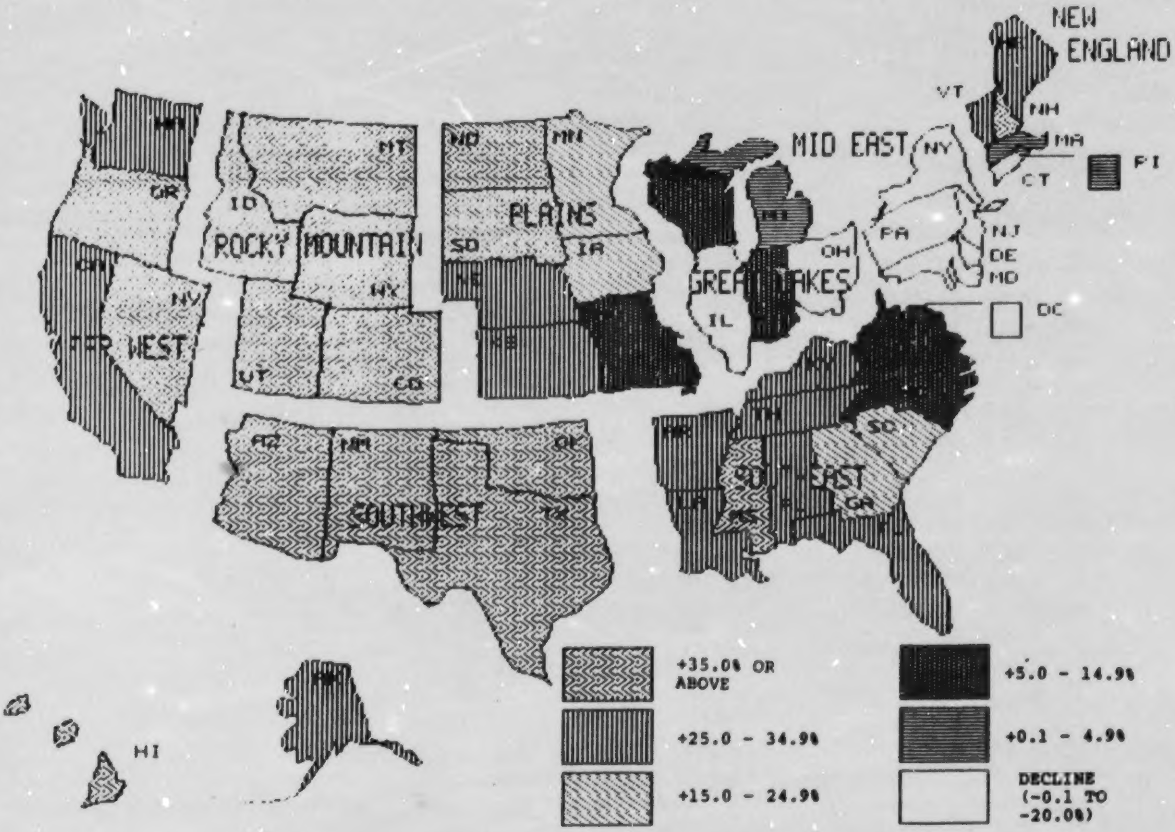
Declining enrollment also costs the schools. In addition to the operational costs associated with maintaining unoccupied or underutilized buildings, outmigration increases personnel costs per pupil. For instance, one school system in the Great Lakes area was forced to close 42 schools within a two-year period. At the end of that time, 87 percent of the teaching staff was at the top of the pay schedule.

TABLE 3. SCHOOL-AGE POPULATIONS; 1985 TO 2000

State and Region	Percent Change 1985-1990	Percent Change 1990-2000	Percent Change 1985-2000
United States	+5.3	+12.2	+18.2
New England			
Connecticut	-6.7	+0.3	-6.4
Maine	+5.9	+21.2	+28.2
Massachusetts	-4.0	+6.4	+2.1
New Hampshire	+10.4	+33.6	+47.5
Rhode Island	-2.2	+7.3	+4.9
Vermont	+7.6	+21.1	+30.4
Mideast			
Delaware	-1.5	-3.5	-4.9
District of Columbia	-17.4	-23.1	-36.5
Maryland	-2.2	-1.3	-3.5
New Jersey	-6.9	-6.4	-12.8
New York	-7.6	-8.9	-15.9
Pennsylvania	-4.2	-3.8	-7.8
Great Lakes			
Illinois	-0.8	-5.9	-6.6
Indiana	+3.1	+2.0	+5.2
Michigan	0	+1.4	+1.4
Ohio	-2.0	-3.4	-5.3
Wisconsin	+5.6	+6.6	+12.5
Plains			
Iowa	+7.8	+7.2	+15.6
Kansas	+12.9	+13.6	+28.1
Minnesota	+7.2	+11.1	+19.1
Missouri	+6.3	+5.1	+11.7
Nebraska	+12.2	+19.6	+34.2
North Dakota	+15.3	+20.1	+38.5
South Dakota	+17.4	+20.0	+40.9
Southeast			
Alabama	+7.6	+18.7	+27.7
Arkansas	+10.7	+16.9	+29.5
Florida	+9.1	+18.0	+28.7
Georgia	+3.2	+13.7	+17.3
Kentucky	+9.6	+22.5	+34.2
Louisiana	+12.6	+19.5	+34.6
Mississippi	+23.8	+27.4	+57.8
North Carolina	+0.8	+10.8	+11.7
South Carolina	+4.6	+13.9	+19.1
Tennessee	+7.0	+20.2	+28.6
Virginia	+1.1	+10.4	+11.7
West Virginia	+2.0	+3.3	+5.4
Southwest			
Arizona	+15.8	+35.2	+56.6
New Mexico	+16.8	+25.8	+46.9
Oklahoma	+14.1	+20.3	+37.3
Texas	+13.5	+28.2	+45.5
Rocky Mountain			
Colorado	+12.3	+30.0	+45.9
Idaho	+21.0	+30.5	+57.9
Montana	+14.9	+19.3	+37.1
Utah	+31.4	+39.4	+83.1
Wyoming	+29.9	+47.1	+91.0
Far West			
California	+10.7	+19.6	+32.4
Nevada	+15.8	+38.6	+60.5
Oregon	+18.1	+32.2	+56.2
Washington	+7.0	+18.1	+26.4
Alaska	+8.8	+17.3	+27.6
Hawaii	+12.4	+25.4	+40.9

Source: George Masnick and John Pitkin. "Cohort of School-Age Populations for States and Regions," prepared for the School Finance Project (1982).

FIGURE 5. SCHOOL-AGE POPULATIONS; 1985 TO 2000



The National Center for Educational Statistics (NCES) has reported that only 10 percent of the per pupil cost can be saved immediately when a student leaves the district. Lee Wolfe of NCES has observed that the schools must continue to pay money on "phantom kids." According to NCES, it takes five to six years after a student leaves to wash out the associated overhead costs.

THE DEMAND FOR SCHOOLING: EDUCATIONAL NEED

That some students cost more to educate than others is well documented. This factor is the basis for much of the federal assistance to education. The special needs students bring to school contribute to the financial demands placed on educational budgets. The "publicness" of public education discussed earlier usually requires that those needs be met without regard to available resources.

One of the great problems inherent in projecting future educational needs is the attempt to identify specific characteristics and needs students (who may not even be born yet) will bring to school in the future. Recent trends and an assumption that those trends will continue must serve as the analytical bases for determining the future financial demand from special educational needs.

The increased percentage of secondary students is having a short-term effect. Experience suggests other student characteristics such as poverty, limited English proficiency, and handicapping conditions are apt to place a greater financial demand on the public schools.

High School Students

The Department of Education (ED) estimates that the cost to educate a high school student (grades 9-12) is 1.5 times as much as that required for an elementary student (grades K-8). ED, in examining per pupil costs and the implications of student age shifts, has reported,

> Thus, the cost per student was forced upward by the movement of students from the elementary to the secondary levels. In 1970, secondary students represented 29 percent of enrollment; by 1975, they accounted for 32 percent, and this proportion remained between 32 and 34 percent throughout the rest of the decade. (24:40)

The elementary/secondary ratio remained at approximately the same through the early 1980s. It is expected to continue through much of the decade until the projected increase in birthrate begins to reverse the pattern.

Poverty

The proportion of school-age children in poverty rose in the 1970s. Drawing on the practices of several states that provide extra aid for such children, the cost to educate a child from a poverty-level family is about 25 percent more than average. (26)

The actual increases were concentrated in about half the states, especially the Northeast, Michigan and Illinois. This pattern may persist in the 1980s as the anticipated outmigration takes a disproportionate number of higher income residents away; thereby increasing the relative proportion of poverty students.

In addition to the outmigration influence, other factors that can influence the relative growth of school-age children in poverty in a specific area are: the higher fertility rate among low-income populations, inmigration (movement within a country), and immigration (from outside the country). Immigration, such as the influx of illegal aliens in border states, not only increases the numbers and usually the proportion of school-age children in poverty, but often increase educational demand because of their unfamiliarity with English.

Limited English Proficiency

A great disparity exists among states in the percentage of students with limited English proficiency. Six states--New York, California, Texas, Arizona, New Mexico and Hawaii--have concentrations exceeding 10 percent. An additional seven states range from 4 to 10 percent incidence. The remaining 37 states have 3 percent or less, although individual school districts within those states may have higher concentrations of such children.

Apart from the level of concentration, costs to a district will vary with the number of languages being served. For example, a Texas school district with a large percentage of students with limited English proficiency who are all conversant in Spanish is apt to have less financial demands than a district in Florida where 9 percent of the students speak 56 different languages.

Handicapped Children

The proportion of handicapped children across all states is more constant than other special need characteristics. In the 1979-1980 school year, the proportion of children receiving special education services for the handicapped ranged from a high of 12.4 percent in Massachusetts to a low of 5.3 percent in New Hampshire. (25:33)

Services for the handicapped are generally much more expensive than services for the average student or for the student with other special needs. The procedure for calculating state allocations, referred to as weighted pupil average, usually assumes the cost of educating a handicapped child at three times a regular student.

Following the passage of the Education for All Handicapped Children Act, generally referred to as P.L. 94-142, the number of handicapped students served by the public schools has increased every year.

The actual costs of educating a child is not always the only variable in financial demand. As discussed later under litigation costs, 2 of every 5 cases involving students from 1977 to 1981 related to the education of handicapped children.

Instructional Mandates

Federal and state mandates usually require special services and compliance paper work. Both increase the financial demand on the schools. For example, "related services" under P.L. 94-142 has been interpreted to require such services as psychotherapy and catheterization at public school expense.

The Push for 'Excellence'. In the aftermath of the report from the National Commission on Excellence in Education, a renewed interest in educational quality has emerged across the nation. States are adding hours to the school days and days to the school year in response to a perceived need. New curriculum guidelines and course requirements are being put in place. (See "Cases in Point: California," page 22.)

Exit tests. Many states have instituted minimum competency tests to qualify students for graduation. A great deal of time and money has gone into the concept at the state and local level. The idea met its first great challenge when Florida withheld diplomas from more than 3,000 high school seniors who failed the test. Legal analysts and state testing experts say the decision under *Debra P. v. Turlington* tends to support the judicious use of exit tests and sets forth a manageable standard.

Math, Science and Technology Pressures

The shortage of math and science teachers and the drop in the number of high school students taking these courses has prompted national dialogue. Suggested remedies include paying teachers of math and science a bonus and adding requirements or inducements in bring more students back to the sciences. Increased use of the computer and courses in computer science are part of the suggested response to these mounting pressures.

Learning by bits and bytes has become the new hallmark of education in the technological age. In addition to the outside pressures to keep up with the new computer era, a recent study by three University of Michigan researchers, reported in the *Journal of Educational Psychology*, indicated students using computers perform better than other students. The improved performance, however, is not cheap.

* * *

A Case in Point: Omaha, Nebraska

In 1983, the school system considered expanding the use of microcomputers in the classroom. The district calculated that to put 3 microprocessors in each elementary school, 10 in each junior high school and 13 in each high school would cost $800,000. The figure reportedly did not include all the software, maintenance, increased energy usage, teacher training, and other associated costs.

* * *

Summing Up Educational Need

Table 4 offers a composite picture of the major educational need factors by state. The most children with special educational needs across the nation are those in poverty. One child in seven falls in this category. Nearly one child in every ten in the country is served as handicapped. While there is overlap in these percentages; i.e., children in poverty may also be unfamiliar with English, the costs to serve each need tend to compound. The sum of these percentages (30.2 percent) does, therefore, suggest that the public schools incur additional special education expenses for nearly one-third of the typical student enrollment.

The separate columns in Table 4 show how extensively educational need varies by state. The percentage of children in poverty ranged from a low of 6.8 percent in Wyoming to 31.3 percent in Mississippi. The percent of limited English-proficient children ranged from less than one percent in Wisconsin to more than 25 percent in New Mexico. The range in the percentage of children served as handicapped did not vary as widely as the other two barometers of educational need -- running from 5.3 percent to 12.4 percent. The wide range in educational needs again emphasizes the fact that national averages obfuscate state by state divergence.

TABLE 4. COMPOSITE INDEX OF STUDENT EDUCATIONAL NEED; BY STATE

Region and State	Percent Children in Poverty 1980	Percent Children Served as Handicapped 1979	Percent Limited-English-Proficient Children 1980	Index of Educational Need	Classification on Educational Need Index
United States	15.2	9.2	5.8		
New England					
Connecticut	11.0	10.5	5.1	8.5	Moderate
Maine	14.5	10.0	3.1	11	Moderate
Massachusetts	12.7	12.4	3.8	11	Moderate
New Hampshire	8.3	5.3	3.1	6	Low
Rhode Island	12.7	9.8	4.5	10.5	Moderate
Vermont	11.8	10.3	2.2	8	Low
Mideast					
Delaware	13.9	11.4	2.4	11	Moderate
District of Columbia	25.4	2.5	2.5	12	High
Maryland	11.6	11.6	2.2	8	Low
New Jersey	13.4	11.0	6.3	11.5	High
New York	18.1	6.7	14.3	13	High
Pennsylvania	13.6	8.9	3.1	10	Moderate
Great Lakes					
Illinois	14.6	10.7	3.9	11	Moderate
Indiana	10.9	8.5	2.2	7.5	Low
Michigan	12.8	7.7	1.4	9	Moderate
Ohio	12.6	9.3	1.9	10	Moderate
Wisconsin	10.0	7.4	0.9	6	Low
Plains					
Iowa	8.9	10.6	1.0	8	Low
Kansas	9.8	8.7	1.8	7	Low
Minnesota	9.5	10.5	1.2	8	Low
Missouri	14.2	10.9	0.8	11	Moderate
Nebraska	10.7	10.4	2.0	8	Low
North Dakota	14.2	7.8	1.8	9	Moderate
South Dakota	18.5	6.9	1.2	12	High
Southeast					
Alabama	21.5	9.4	*	12	High
Arkansas	22.2	8.9	*	12	High
Florida	16.7	8.6	5.9	13.5	High
Georgia	20.3	9.2	1.0	13	High
Kentucky	22.3	9.5	*	12	High
Louisiana	23.8	9.9	5.0	14	High
Mississippi	31.3	8.5	*	12	High
North Carolina	17.4	9.5	*	12	High
South Carolina	19.3	11.2	*	13	High
Tennessee	21.3	10.6	*	13	High
Virginia	13.4	8.5	1.3	10	Moderate
West Virginia	17.3	8.5	*	12	High
Southwest					
Arizona	14.2	9.3	15.0	11	Moderate
New Mexico	21.1	7.2	25.4	13	High
Oklahoma	14.4	10.1	2.6	11	Moderate
Texas	18.4	8.8	18.0	14	High
Rocky Mountain					
Colorado	11.0	7.9	6.3	6.5	Low
Idaho	13.3	8.6	2.7	10	Moderate
Montana	12.7	7.8	2.0	9	Moderate
Utah	9.7	10.5	2.2	8	Low
Wyoming	6.8	9.3	2.1	7	Low
Far West					
California	13.8	8.7	14.1	11	Moderate
Nevada	9.3	7.3	3.6	6	Low
Oregon	10.6	8.4	2.1	7	Low
Washington	10.8	6.7	2.2	6	Low
Alaska	9.6	9.0	6.7	7.5	Low
Hawaii	11.0	6.2	12.4	7	Low

*Not Available

Source Department of Education

OPERATIONAL DEMANDS

Not all costs related to education show a direct relationship to the demand for schooling. More subtle costs such as those related to maintenance, asbestos detection and removal, litigation, and energy are essential parts of doing school business.

The Maintenance Gap

A joint report by the American Association of School Administrators, the Council for Great City Schools and the National School Boards Association in January 1983, forcefully presented one measure of the financial problems the schools face. The report, "The Maintenance Gap: Deferred Repair and Renovation in the Nation's Elementary and Secondary Schools," states that the nation's educational infrastructure is in a critical state of disrepair. The report concluded:

> Building experts estimate that schools are deteriorating at a far faster rate than they can be repaired, and faster than most other public facilities. Plumbing, electrical wiring, and heating systems in many schools are dangerously out-of-date; roofing is below code in thousands of schools; and school-operated transit systems are judged by some to be unsafe. The accumulated cost to repair the nation's public elementary and secondary schools can now be conservatively place at approximately $25 billion.(2)

An estimated $25 billion constitutes a large gap in maintenance and documents the severe financial conditions under which America's schools are operating. Deferred maintenance has great implications for school energy costs as well, for experience has shown that the most cost-effective way to save energy is through operations and maintenance. The high cost of deferred maintenance becomes even higher as delays add to the fuel bill.

Asbestos

Another cost in maintaining the educational facility is asbestos inspection and removal. Inspections were mandated by a 1980 federal law that required they be completed by June 1983. Some states had gone the next step and required the immediate removal of asbestos found during inspection. In 1983, Alabama and Massachusettes had major appropriations bills for removal. The Boston school district alone has estimated it will cost $40 million to remove or contain asbestos in the city's 105 schools.(11)

In October, the U.S. Department of Education (ED) released a document, "Asbestos in the Schools, A Report to Congress." The report estimated the cost of removal of asbestos from the nation's schools $1.4 billion.

In addition to removal costs, litigation costs related to asbestos are expected to place further financial demands on the schools.

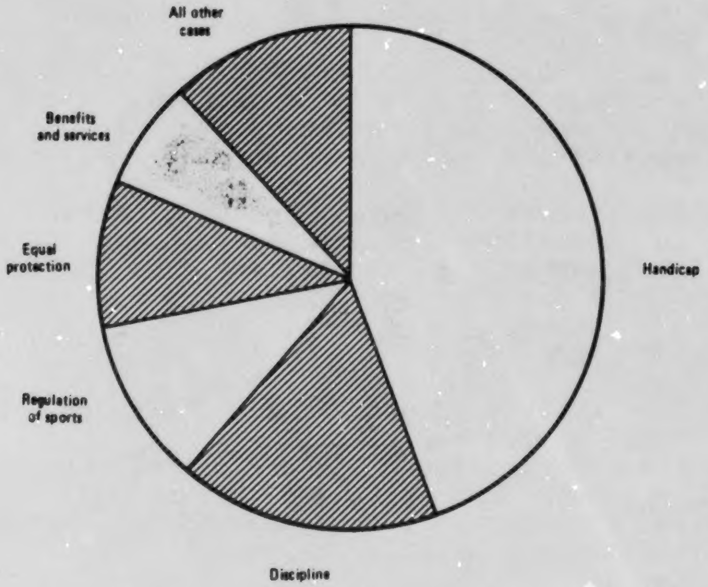
Litigation

The U.S. Attorney General's 1981 report, "The Attorney General's Asbestos Liability Report to Congress," suggested schools consider litigation against asbestos manufacturers. The report stated that school officials, "as a matter of utmost urgency," should consult with lawyers to determine whether they have grounds for a lawsuit.

At the same time, attorneys suggested school districts could be sued if they failed to treat their asbestos problems. E. Robert Wright, lead attorney in the Attorney General's report has observed, "...I think it is quite possible that school districts will also become responsible." (12)

In recent years, many issues related to instruction have been the subject of public discussion, policy formation, and even contention. Some issues inevitably have found their way into the courts for resolution. In just the area of civil cases involving students, 1,734 entailed court action between 1977 and 1981. ED believes this figure is an underestimate of the total. Figure 6 indicates the percentage distribution of civil cases involving students.(24)

FIGURE 6. PERCENTAGE OF DISTRIBUTION OF CIVIL CASES INVOLVING STUDENTS



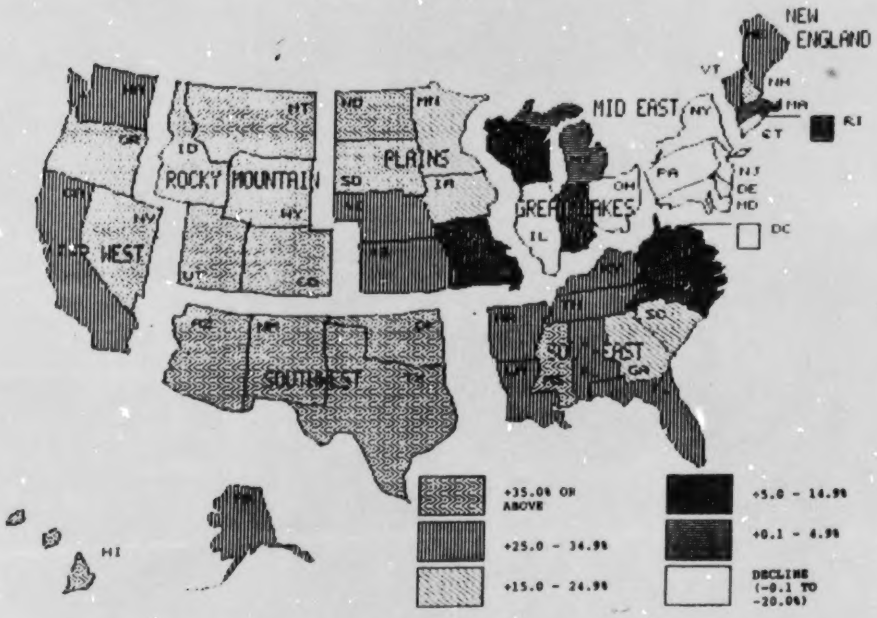
Source: Department of Education

Most legal costs center on the civil rights mandates imposed upon the schools by state and federal law. Mandates may involve courses of study, reporting requirements, exit tests, and other issues. The myriad of requirements has grown to the point that the Illinois state superintendent of education recently said it was time to "de-mandate" the mandates. Recognizing the instructional burden, the compliance headaches and the legal ramification, some states, such as Michigan, require the state to provide funds to implement any new mandates.

Population Changes

As previously noted, national averages tend to obfuscate local problems. National enrollment figures are a good case in point. The population drift toward the sunbelt often causes under-utilized schools in the North Central and Northeast area and increases the demands for space and services in the South and West. Ironically, both cause financial difficulties for the schools. The cost of new construction is more obvious and generally garners community support. Overcrowding is easy to convey. But a less popular activity, such as closing schools, costs money, too. Money to prevent the closed buildings' deterioration, money to sell or renovate, money to transport students greater distances -- all adds up. Figure 7 shows the anticipated shift in student population by states.

FIGURE 7. SHIFTS IN STUDENT POPULATION BY STATE



Energy

Of ALL the costs creating a financial bind for the schools, the most frequently cited factor contributing to those budget woes is "increased costs of fuel for heating/cooling." Energy problems continue to plague the schools.

The following section reviews the energy situation and summarizes price and availability projections through the year 2000. It is followed by an assessment of the impact energy will have on the nation's schools through the end of the century.

ENERGY PROJECTIONS

When energy projection are made, they are often based on assumptions about various unknowns. Consequently, most disparities among energy projections result from differences in assumptions.

Economic Changes

One unknown is U.S. economic growth. If, for example, the economic growth is just 0.5 percent per year higher than the assumed level in the mid-range DOE scenario used later, the U.S. total energy consumption would increase with the resulting effects:

- Total primary energy consumption by the year 2000 could increase by about 12 percent.
- Electric consumption could increase by 10 percent.
- Oil imports could go up 16 percent by 2000.
- Gas imports could go from the projected 1990 level of 1.9 trillion cubic feet (tcf) to 2.2 tcf and from the 2.6 tcf to 3.3 tcf by 2000.(28)

Should the economic activity be less than projected the trends in consumption and imports, of course, would go in the opposite direction. Thus, it can be seen that plus or minus even one-half of one percent can produce significant long-term changes in energy patterns.

World Conditions

As noted earlier, trouble spots around the world have energy implications. The extent of such disturbances and their potential energy ramifications are, of course, impossible to predict and constitute an unknown. For example, Dr. Kanovsky has described a situation in which the Iraq-Iran war could depress the price of oil. Or, it and/or other Middle East conditions could disrupt supplies and send prices up. Unrest in other areas, such as Central America, could impact on energy projections. The need for greater economic stability in non-OPEC oil producing countries, such as England or Mexico, could prompt a change in production goals. An accelerated rate of industrialization in Third World countries could dramatically alter worldwide energy demands.

Energy Conservation

Oil use started dropping in 1979, after growing steadily for 28 of the last 31 years. Due to conservation achievements, analysts now believe the country will need about 12-14 million barrels a day of oil equivalent (mbde) less in 1990 than was projected only a few years ago. (6:131-2)

Some previous errors in energy pricing forecasts appear to have resulted from the miscalculation of the effect higher fuel prices would have on the inclination to conserve. It is generally conceded today that higher energy prices prompted more conservation in the 1970s and early 1980s than was anticipated.

Despite the careful tracking of this phenomenon, it is difficult to judge whether even higher prices would continue to have this effect. Basic energy needs become increasingly inelastic and the degree to which energy efficiency can compensate is unknown. Indications are that people do become somewhat inured to higher fuel prices, as shown by the growing percentage of large automobile purchases.

Improved Technology

Another important unknown in projecting future energy needs is the effect of improved technology; technology that could improve energy efficiency and, thereby, reduce consumption or, technological advances that could enhance recovery processes and/or make alternative energy sources more cost-effective. Such scientific accomplishments could impact energy supply or demand and change energy forecasts dramatically.

Other factors such as the effect of price on production, exploration access and results, the lag time in industrial development to respond to new energy demands, or the costs of meeting environmental needs all affect energy trends. The relative emphasis analysts place on such factors and the assumptions they make with regard to them create wide disparities in carefully considered projections.

SCENARIOS IN ENERGY

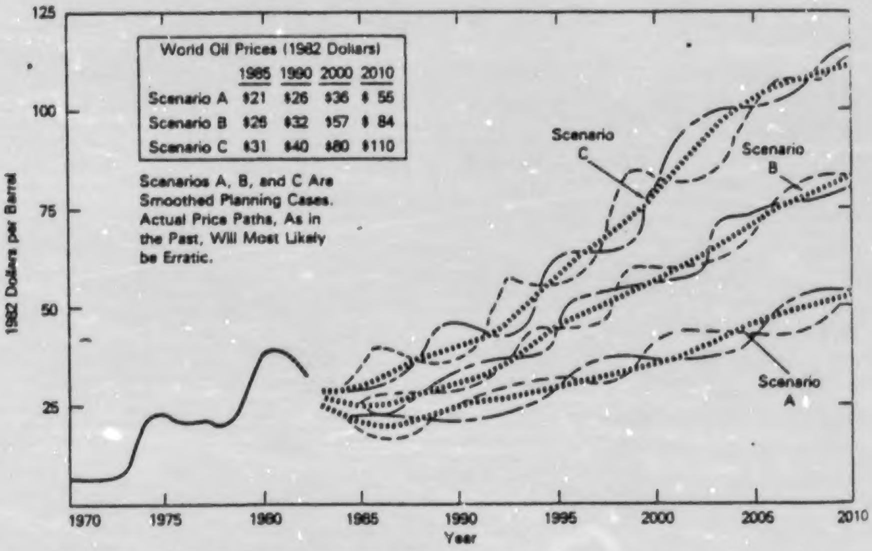
In any assessment of long-term energy trends, three inextricably linked facets emerge: 1) price, 2) energy source and/or mix, and 3) availability. These facets will be discussed as appropriate in relation to each fuel source treated below. Projected cost comparisons across fuel sources will be presented following the treatment by fuel type. Since oil prices still undergird the energy market, a more comprehensive treatment of the production and pricing patterns will be addressed first.

Oil

World oil prices are expected to show a broad trend, hovering near their 1983 levels or easing downward through 1985. From 1982 to 1985, the price drop could reach 27 percent for distillates and a 18.7 percent or residuals. Between 1985 and 1990, world economic activity is expected to cause significant upward price pressures. Prices are expected to climb 17 percent higher by 1990. A world oil price surge in the early 1990s is expected to push the price up another 38 percent. A slower rate of increase at approximately 20 percent is projected for the remainder of the century.(28)

Recognizing the inherent uncertainty associated with performing long-term analysis, DOE used mathematical models to generate three alternative scenarios in its Energy Projections to the year 2010. Scenario A combines high energy demand reduction potential with high energy supply potential resulting in relatively lower projected world oil prices than the other scenarios. Scenario C combines low energy demand reduction potential with low energy supply potential, resulting in relatively higher projected oil prices. Scenario B is a reference case with assumptions between Scenarios A and C. Figure 8 shows the pricing trends over time for the three scenarios. Since supply disruptions, economic recessions and recoveries, unusually cold or warm weather, and other unpredictable events are apt to induce volatile price behavior, the wavy lines in Figure 8 exemplify this erratic price pattern around the basic trend.

FIGURE 8. WORLD OIL PRICE SCENARIOS: DOE NEPP-1983



World Oil Prices (1982 Dollars)

	1985	1990	2000	2010
Scenario A	$21	$26	$36	$ 55
Scenario B	$25	$32	$57	$ 84
Scenario C	$31	$40	$80	$110

Scenarios A, B, and C Are Smoothed Planning Cases. Actual Price Paths, As in the Past, Will Most Likely be Erratic.

*U.S. Refiner Acquisition Cost of Crude Oil Imports.

DOE surveyed representatives of trade associations, private corporations, universities, government and research groups to assess the judgmental probabilities related to the scenarios. They found relative concurrence with the DOE projections. The rest of the discussion relative to oil will rely, therefore, on the DOE figures. Wherever a range of figures pertaining to oil prices is given, the low figure will be drawn from Scenario A and the high figure from Scenario C.

By 1990, the world price *in 1982 dollars* most likely will fall between $26 and $40 per barrel, or about the price of 1981 oil. After 1990, price projections become increasingly speculative; however, the general concurrence is that prices will begin to climb. By 2000, oil costs per barrel *in real terms* (1982 dollars) are expected to be in the $36-$80 range.

Using constant dollars offers consistency for comparison purposes. However, few people pay a current fuel bill while saying, "In 1982, this would have been...." Furthermore, transactions on the world oil market are conducted using the American dollar at current value. To give a better picture of what the projected costs might mean to a school budget, Table 5 presents the costs cited above along with a moderate inflation rate of 6 percent per annum. A straight line progression was used to calculate the price increases for the intervening years.

TABLE 5. WORLD PRICE OF OIL PROJECTIONS WITH INFLATION AT 6 PERCENT PER ANNUM

	1985		1990		2000	
	In 1982 Dollars	@ 6% Per Annum	In 1982 Dollars	@ 6% Per Annum	In 1982 Dollars	@ 6% Per Annum
Low Range	$23.00	$27.39	$26.00	$40.20	$36.00	$ 85.93
Mid Point	26.50	31.00	33.00	45.65	58.00	116.66
High Range	30.00	35.73	40.00	56.38	80.00	156.84

It can be seen from Table 5 that the cumulative effect of a moderate 6 percent inflationary rate is more apt to place the world price of a barrel of oil in the $40 to $56 range by the end of this decade and in the $86 to $157 by 2000.

World oil price is defined as the average U.S. refiner acquisition cost of crude oil imports per barrel. The price, therefore, does not include refining, transportation, operational margins, and other factors that are part of the retail cost the school district will have to pay. The percent increase of delivered price over world price is not consistent over time. Table 6 shows the DOE projections for world price and the projected cost of distillate per million Btus (MMBtus).

TABLE 6. DOE WORLD OIL PRICE PROJECTIONS AND PROJECTED COST OF DISTILLATES

Year	World Price 1982 $	Delivered Price* Distillate $/MMBtu	Delivered Price* Distillate $/Bbl	Percent Increase Delivered Price Over World Price
1980	$39.30	$7.57	$43.91	11.6%
1982	33.59	7.80	45.24	34.7%
1985	25.89	6.14	35.61	37.0%
1990	31.90	7.20	41.76	30.9%
1995	46.50	9.95	57.71	24.0%
2000	57.40	12.00	69.60	21.0%

Source: Department of Energy
*Delivered price/barrel = Delivered price/MMBtu times 5.8 (There are 5.8 MMBtu/bbl.)

If the percent increase for the delivered price over the world price is applied to the low, mid, and high range scenarios depicted in Table 5, the actual projected cost of a *delivered* barrel of oil under a 6 percent per annum inflation rate would be from $37 to $49 in 1985, $53 to $74 in 1990 and $104 to $190 by the year 2000.

While analysts largely concur about the pattern oil production, consumption, and prices are apt to take in the next few years, they do not agree in their projections about natural gas and electricity.

Natural Gas

According to the American Gas Association, the price of natural gas increased an average 26 percent per year from 1972 to 1977 and 16 percent per year from 1977 to 1982. Most all analysts foresee a slowdown in this price escalation, with the increase per year from 6 to 11 percent.

Projecting natural gas prices or weighing other considerations related to it seemed fraught with confusion in 1983, due to Congressional consideration of the wellhead decontrol issue. This political climate prompted analysts to project natural gas prices based on the position they hoped Congress would take.

The political aura which surrounds natural gas projections exacerbates the already existent uncertainties connected with energy projections. Conditions under existing law and studies made before decontrol became such a volatile issue offer a basis of comparison. Two of the more highly regarded studies on decontrol under the Natural Gas Policy Act of 1978 (NGPA) by Amoco and DOE (1982) predicted an increase of 48 and 53 percent, respectively, from 1982 to 1985. A rough average of 50 percent puts the Amoco/Doe 1982-1985 increase at $5.70, which was adjusted for inflation at 10 percent per annum.

Table 7 compares analyses of the average *industrial* costs under various federally controlled conditions.

TABLE 7. PROJECTED NATURAL GAS COSTS: INDUSTRIAL COST PER MCF

		PROJECTION SOURCE				
		DOE 1983			EARLIER STUDIES	
YEAR		NGPA	ADM'S PROPOSAL	AGA (NGPA)	AMOCO/DOE	AFL-CIO
Hist.						
1982	$3.80					
Proj.						
1983		$3.82	$3.52			
1984		3.96	3.81	$4.68		
1985		4.25	4.02	5.47	$5.70*	
1986						$6.46
1987				5.49		
1990		5.38	5.24	6.65		
1995		6.36	6.22			

*Adjusted for inflation at 10 percent per annum

When the more recent projections presented in Table 7 are compared to the earlier Amoco/DOE figures, all but AFL-CIO's fall below the $5.70 mark. The more recent studies suggest that the range of prices by 1985 under NGPA or with some earlier decontrol will probably be somewhere between $4.25 and $5.47 (in 1982 dollars). Using a midpoint in this range, $4.86, inflated by a rate of 6 percent per annum, would put the 1985 natural gas price tag at $5.89. Therefore, in spite of the political considerations; the more recent studies on average are more consistent with earlier projections than might be surmised by the rhetoric.

All the above conjecture, however, is related to wellhead price changes. The picture is further complicated by contractural arrangements between producers and pipelines and between pipelines and distributors. The price impact of any federal action to modify or abrogate those contract conditions is unknown.

Order 30. In August 1983, the Federal Energy Regulatory Commission (FERC) published Order 30 in the *Federal Register*.(15) FERC Order 30 could have a mitigating effect on the increasing cost of natural gas to schools.

Designated under the ruling as high-priority end-users, school districts are now able to contract directly with producers, intrastate pipelines and distributors for less expensive natural gas supplies and have it delivered in their current distributor's pipelines.

Order 30 has been put forward as an experiment and is scheduled to be in effect until June 30, 1985. During the spring of 1985, FERC will conduct a comprehensive review of gas markets to determine what, if any, future procedures are warranted.*

At the end of 1983, it was too soon to determine what, if any, natural gas price relief the schools might experience as a result of Order 30.

Electricity

The contribution of electricity to the energy mix is expected to increase, but not at the pace set in the 1960s (6.9 percent) and 1970s (4.0 percent). From a 15 percent share of primary energy consumption in 1960, electricity moved to a 31 percent share in 1980, and is expected to reach a 42 percent share by 2000. The projected growth rate is set at 3.6 percent from 1982 to 1990, falling to 1.9 percent beyond 1990. (28:14)

Electrical generation will depend more heavily on coal as a primary fuel source, advancing from about 50 percent in 1980 to 59 percent in 2000. Oil and gas used to generate electricity are expected to be priced out of utility markets, falling from 27 percent in 1980 to around 8 percent by 2000. (*ibid*.)

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*In addition to the cited regulations, those interested in more information regarding the implementation of Order 30 may call Mr. Ken Workman, Department of Energy, Washington, D.C. (202) 252-9624.

Utility Costs. Projecting a pattern of future electrical costs is difficult. Prices for electricity are set by state level commissions and vary widely from state to state. Furthermore, rate schedules among utilities vary considerably within a given state. Unlike other fuel suppliers, utilities often charge for the rate of delivery (demand charges), not just the quantity. Some utilities assess a penalty as a percentage of a previous peak demand (ratchet) and charge the consumer that penalty for a period of time in the subsequent year. In addition, some utilities charge a power factor penalty. Finally, the costs of the primary fuel are reflected in the bill. Since a uniform national market does not exist, projecting a pattern of future electrical costs poses problems and can mislead the individual consumer. Nevertheless, broad trends are helpful in assessing future electrical costs.

Approximately 40 percent of the delivered price of electricity is the fuel adjustment charge, or the cost of the fuel needed for generating electricity. To that extent, the cost of electricity will be strongly influenced by the price of oil and gas in the next few years. By the mid-1990s, when the utilities are expected to be less dependent on oil and gas, the prices should stabilize.

Nationally, the utility costs are expected to fall considerably below the 1980-1982 growth rate of approximately 25 percent/kWh. In fact, they are expected to hold about even in 1982 dollars until the mid-1980s, climbing about 10.6 percent (in constant dollars) by 1990. Another jump of 13 percent is expected by 1995, with costs then leveling off with a modest 2 percent increase by the year 2000. (28:3-5) Again, these percentages are national averages and may vary tremendously by local rate structures and the utility's primary fuel source.

In contemplating future utility costs, it is important to note that other fuel sources are expected to increase far more rapidly than electricity late in this century and into the next one. (See Cost Comparisions, p.58-60)

Availability. Far greater disagreement exists over the ability of the utility industry to meet demand by the end of this decade. Peter Navarro writing in the July/August 1982 Harvard Business Review pointed to the financing problems the utility industry has been experiencing. Navarro observed that consumer-oriented state rate commissions, in juxtaposition with the utility's need to satisfy its stock holders, were creating a major financial bind. In addition to this financial squeeze, high interest rates in 1981-1982, problems associated with nuclear power, and lower electrical demand due to the recession and conservation had caused the cancellation or deferral of plants under construction or on the drawing boards. As a consequence, Navarro projected serious power shortages by the end of the decade with localized brown-outs as early as 1984.

A 1983 study by DOE commissioned by the White House (13) had a similar theme with a slightly longer time frame. As a result of its study, DOE concluded that a massive power plant construction program was needed to avert power shortages in the 1990s.

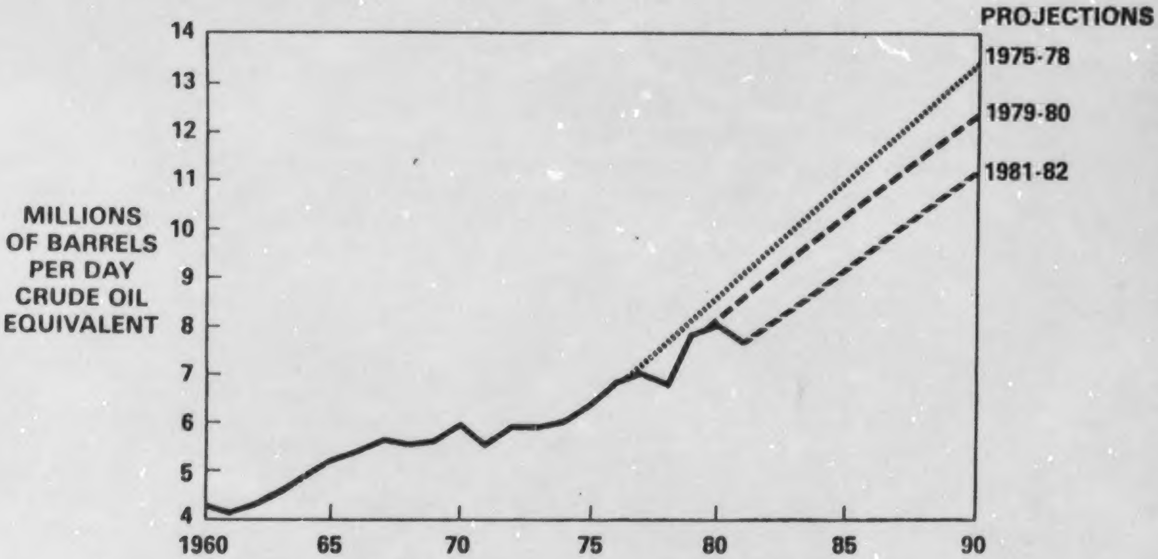
A report issued in late 1983 by the Congressional Research Service (CRS) took exception to the DOE conclusions. CRS took the position that alternative energy sources and conservation could make major contributions to electrical demand by 2000. CRS reportedly saw no supply deficit by 1990 and a 128,000 megawatt deficit in 2000.(14) At least two-thirds of the deficit, CRS said, could be met by aggressive conservation.

To the extent that power plant construction will be needed, a decision by the Federal Energy Regulatory Commission (FERC) in May 1983 to allow utilities to charge customers up to half the costs for construction work in progress (CWIP) may make a significant difference in the cost of electricity to the consumer. The American Public Power Association, which represents publicly owned retail electric distributors, calculated that consumer bills across the nation could rise by a total of $6.5 billion a year if state utility commissions followed FERC's lead. According to the Congressional Research Service, however, state commissions are tending to move toward disallowing CWIP in rate approvals. If allowed by the respective state, schools in areas of inmigration and industrial growth, such as the sunbelt, are most apt to feel this cost.

Coal

The United States' most abundant fuel is coal. Even though there have been some difficulties in using this fuel cleanly enough to meet environmental standards, coal is expected to serve as an important transitional fuel well into the next century. As can be seen from Figure 9, however, the projections on U.S. coal production through 1990 have been declining since 1975.

FIGURE 9. U.S. COAL PRODUCTION POST-1974 PROJECTIONS



NOTE: EXCLUDES EXPORTS

SOURCES: BUREAU OF MINES, DEPT. OF ENERGY, BUREAU OF THE CENSUS (1960-81)
PUBLISHED GOVERNMENT AND PRIVATE ENERGY PROJECTIONS (1985-90)

Existing coal capacity, both mines and transportation, could provide most of the projected 30 percent increase in coal production between now and 1990. Even if the development of coal in the long term is held to 50 percent of estimated reserves due to environmental constraints, high state severence taxes, or location (under cities or highways), the coal supply is expected to be adequate to meet projected demand.(28:1-21)

Since coal energy is more apt to be delivered to the schools as generated electricity, the retail price trend of coal is not treated here. The cost of coal in relation to nuclear power for electrical generation is presented in Table 8.

Nuclear Power

Projections reflect a slowdown in the construction of nuclear power plants as a result of lower electrical demand, the utilities' financial concerns already discussed and higher construction costs. The latter two are often related to delays in nuclear construction resulting from increased industry, public and government vigilance following the Three Mile Island incident.

No new orders for nuclear plants have been placed for several years. New orders are expected in the late 1980s as more generating capacity is needed and more safeguards have been implemented.

As oil and gas price themselves out of the utility market, the debate over nuclear power expenses *vis a vis* coal arises. If coal is accessible to the utility, coal is generally cheaper, according to a Department of Energy analysis. The analysis of 1980 costs reported in "Projected Costs of Electricity from Nuclear and Coal-Fired Power Plants, Volume 2" reveals that nuclear power generation had a cost advantage of 5 percent or more over coal in the Northeast and portions of the South. Table 8 compares the cost experiences of coal and nuclear by regions of the country.

TABLE 8. COST EXPERIENCES: NUCLEAR VS. COAL BY GEOGRAPHICAL REGION

Cents Per Kilowatt Hour in 1980:	Fuel Costs	Operating Costs	Capital Costs	Total Costs
NORTHEAST: Ct Me Ma NH RI Vt NY				
Nuclear	0.627	0.636	1.194	2.457
Coal	----	----	----	----
MIDDLE ATLANTIC: De Md NJ Pa				
Nuclear	0.446	0.812	1.707	2.965
Coal	1.278	0.226	0.608	2.112
SOUTH: Al Ar Fl Ga La Ms NC Ok SC Tn Tx Va				
Nuclear	0.516	0.516	1.558	2.590
Coal	1.036	0.253	0.764	2.053
EAST NORTH-CENTRAL: Il In Ky Mi Oh WV Wi				
Nuclear	0.432	0.439	1.155	2.026
Coal	1.474	0.234	0.875	2.583
WEST NORTH-CENTRAL: Ia Ks Mn Mo Ne ND SD				
Nuclear	0.481	0.480	1.224	2.185
Coal	1.165	0.222	0.918	2.305
FAR WEST: Az Ca Co Id Mt Nv NM Or Ut Wa Wy				
Nuclear	0.507	0.850	1.895	3.252
Coal	0.721	0.388	1.022	2.131
NATIONWIDE:				
Nuclear	0.499	0.569	1.400	2.468
Coal	1.273	0.246	0.835	2.354

Source: Department of Energy

Renewable Energy

Central station power plants and end-use consumers can benefit from renewable energy technologies. Central-electric renewable production is dominated by hydroelectric generators. This potential is, of course, localized. Biomass power plants are already cost-effective and are contributing to electrical needs.

Cost-effectiveness and further development of renewables will be largely a function of the price of oil and gas. Higher fossil fuel costs in the 1990s may spur central-electric development of large-scale wind, photovoltaic and perhaps solar power. Most analysts agree that renewables will have a role in replacing oil and gas; however, the significant costs, technical feasibility, public attitudes and economic considerations create so many uncertainties that no one is eager to issue any forecasts.

While synthetic fuels such as oil shale and coal gasification are often treated separately or in tandem with renewables, they are considered here as an alternative means of production in order to avoid double counting their contribution. The production of synthetic fuels is expected to become increasingly significant in the future. Power plants, which were constructed to accept medium Btu gas from coal gasification, are already in operation.

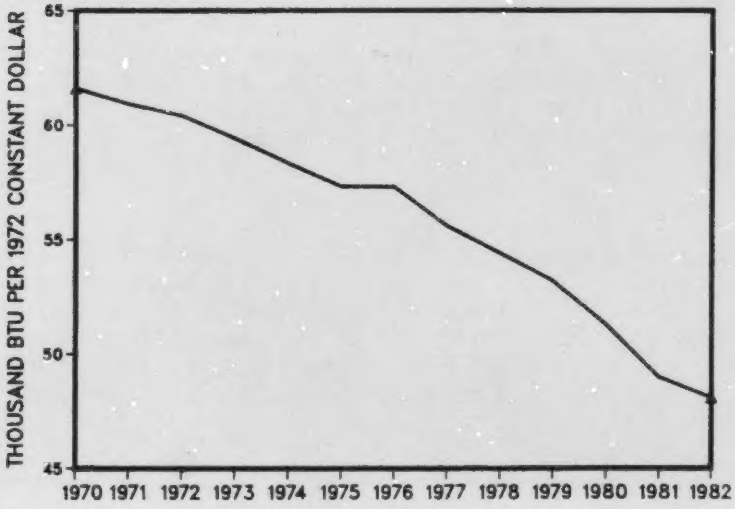
The Best Alternative Energy Source: Conservation

Energy conservation remains the cheapest and most attractive "barrel of oil." The average conserved "barrel" today costs about $ 8 compared to the consumed barrel at roughly $35 (delivered distillate).

Conservation has proven to be an important energy resource. Americans have been using less energy to get the job done as shown in the energy/gross national product (GNP) ratio. In 1973, it took 60,000 Btus to produce one dollar of GNP. In 1982, that figure had dropped to about 48,000 -- a drop of 19 percent.(6) Figure 10 shows the progressive decline in MBtus per GNP dollar.

FIGURE 10. U.S. ENERGY CONSUMPTION PER GNP DOLLAR

(in 1972 dollars)



Source: American Petroleum Institute

United States energy consumption decreased by 5 percent between 1973 and 1982 while economic activity measured by real GNP had increased nearly 18 percent. (*ibid*.)

Conservation reduces demand and lessens the impact of a supply disruption. In 1980, reduced consumption in the United States offset the loss of expected imports from Iran and avoided another shortfall. A third energy "crisis" didn't happen because Americans were using less.

Energy conservation has significantly improved the U.S. position regarding foreign energy dependence. In assessing the drop in consumption for 1982-1983, the American Petroleum Institute (API) attributed less than 30 percent of the decline to the recession. Other factors, particularly conservation, have been credited by API with the major portion of the energy savings. These achievements in energy efficiency are expected to have long-term benefits. The API reports:

> Analysts now believe the country will need about 12 to 14 million barrels a day of oil equivalent (mbde) less in 1990 than projected only a few years ago.

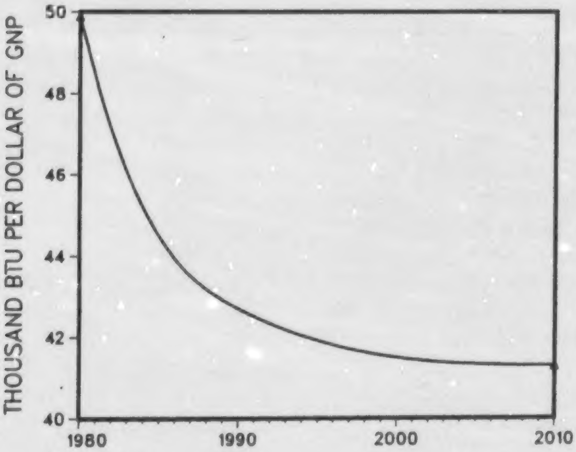
Over the past five years, projections for total U. S. energy consumption in 1990 have dropped by 2.5 mbde, or 25 percent. Even if energy use should rise again during the 1980s -- and it is expected to -- forecasts suggest that the future rate of increase in energy use will be less than that experienced in the past. Part of this slowdown in consumption growth is due to a conservation "lag effect" attributed to higher energy prices.

The Higher Price "Lag Effect". The institutionalization of conservation practice is part of what economists call the "lag effect" of high energy costs. Those studying the energy price/consumption relationship are only beginning to recognize the delayed impact due to the rise in energy prices that occurred during the 1970s.

The total adjustment of energy consumption to a change in energy prices takes place over a considerable length of time rather than the shorter time frame often considered. Instantaneous or short-run responses often happen in the form of end-use restrictions such as lower thermostat settings, and less miles driven. Higher prices, however, also spawn technological innovations which take time to reach the consumer. The stock of capital goods such as homes, cars, buildings, and equipment will gradually be replaced by models which use energy more efficiently or less intensively.

According to one study, if energy prices were to remain constant from 1982 on, the higher energy prices of 1973-1981 would not be fully realized in patterns of energy use until the year 2010. The graph shown in Figure 11 indicates the total lag effect would be 37 years and the energy/GNP ratio would be reduced by 30.5 percent -- nearly one-third during that time.(6:136)

FIGURE 11. THE LAG EFFECT ON ENERGY USE OF HIGHER ENERGY PRICES
RESULTING FROM 1973-1981 PRICE INCREASES



The effects of conservation have already shown its value as an energy resource. But the harvest of energy efficient efforts now underway clearly will continue to benefit the economy for years to come.

COST COMPARISONS

Cost and availability are the two factors school people must consider in long-range planning to meet education's energy needs. In long-range planning, availability often becomes a function of cost in a free market if no international complications intervene.

Comparing future fuel costs affords the school administrator the opportunity to plan future fuel sources and to consider the advisability of fuel option boilers.

Since physical units of fuel do not deliver the same energy value, it helps to reduce them to a common denominator for comparison purposes. Energy value, or the ability to do work, is quantified in Btus. (A British thermal unit (Btu) equals the amount of heat required to raise the temperature of one pound of water by one degree Fahrenheit. A barrel of oil equivalent equals 42 U.S. gallons and contains 5.8 million Btus.) Table 9 presents projected costs of various fuels by resource price and by purchased units, based on million Btus in 1982 dollars for the commercial sector, which includes schools.

The school administrator wishing to use Table 9 to project future fuel costs can convert the dollars/MMBtus into dollars/purchased units such as gallons or thousand cubic feet (mcf) of natural gas of kilowatt hours (kWh) of electricity by dividing by the respective Btu conversion factors. There are 138,690 Btus per gallon of distillate, 149,690 per gallon of residual, 1.03 MMBtus per mcf of natural gas, and 11,600 Btus (source) per kWh. The projected costs cited in Tables 8 and 9 for electricity are for kilowatt hours only. They do not include demand charges, power factor penalties, or cost of work in progress.

TABLE 9. FUEL PRICE SUMMARY: COMMERCIAL SECTOR
(1982 Dollars per Million Btu)

	RESOURCE PRICES				DELIVERED PRICES 1/				
Year	World Oil Price 2/ 1982 $ /Bbl	Refiner Crude Cost	Wellhead Gas Price	Minemouth Coal Price	Distillate	Resid Fuel Oil	Liquid Gases	Natural Gas	Electricity
Hist.									
1960	N/A	1.49	0.43	0.63	2.83	1.87	2.89	2.02	21.01
1965	N/A	1.36	0.44	0.55	2.92	1.53	2.51	1.92	17.02
1970	6.70	1.33	0.39	0.63	3.41	1.45	2.36	1.70	12.96
1975	22.94	2.95	0.74	1.42	4.28	3.72	3.84	2.18	15.23
1980	39.30	5.61	1.89	1.28	7.57	5.30	6.08	3.83	16.06
Esti.									
1982	33.59	5.49	2.36	1.32	7.80	5.60	6.20	5.00	20.11
Proj.									
1985	25.89	4.39	3.18	1.47	6.14	4.55	5.46	5.47	20.32
1990	31.90	5.49	3.90	1.55	7.20	5.59	6.74	5.91	22.24
1995	46.50	8.02	4.80	1.64	9.95	7.96	9.36	6.88	25.13
2000	57.40	9.90	6.75	1.76	12.00	9.73	11.31	8.97	25.56

1/ Projected delivered prices are resource prices plus estimated markups for processing and distribution.
2/ U.S. average refiner acquisition cost of imported crude oil.

Source: DOE - mid-range projections

It should be stressed that the figures appearing in Table 9 on the preceding page are in 1982 dollars. Since the cost of living has historically risen, it seems reasonable to assume it will continue to do so. To highlight this fact and provide the long-range planner more realistic benchmarks, the effect of a moderate inflation rate of 6 percent per annum is presented below in Table 10 along with the 1982 dollar figures cited in Table 9 above.

TABLE 10. DELIVERED FUEL PRICE SUMMARY: COMMERCIAL SECTOR
(Per Million Btus in 1982 Dollars and
Inflated at 6 Percent per Annum)

DELIVERED PRICES BY FUEL TYPE

Year	Distillate Per Gal		Residual Per Bbl		Liquid Gas Per Gal		Natural Gas Per mcf		Electricity Per kWh	
	1982 Dollars	@6% Per Annum	1982 Dollars	@6% Per Annum	1982 Dollars	@6% Per Annum	1982 Dollars	@6% Per Annum	1982 Dollars	@6% Per Annum
Esti.										
1982	1.08	xx	35.21	xx	0.59	xx	5.13	xx	0.069	xx
Proj.										
1985	0.85	.95	28.62	34.09	0.52	0.61	5.61	6.42	0.069	0.082
1990	1.00	1.45	35.14	50.07	0.64	0.96	6.05	9.11	0.076	0.111
1995	1.38	2.32	50.07	89.29	0.88	1.57	7.05	13.38	0.086	0.159
2000	1.66	3.44	61.19	132.74	1.07	2.33	9.18	38.20	0.087	0.214

Source: Department of Energy

ENERGY AND ITS IMPACT ON THE SCHOOLS

In a 1983 survey conducted by the American Association of School Administrators, school superintendents cited energy costs as the greatest contributor to their financial problems.

In the decade since the oil embargo, the cost of energy to the schools has risen more than 700 percent. While lower oil prices have brought a slight respite to a small portion of the schools, most continue to experience higher energy costs. The soaring energy costs of the 1970s are not expected to recur in the 1980s, but the predicted increases will add further budgetary pressures during a time of tighter revenues. The more dramatic increases in energy costs expected in the 1990s are apt to impact severely on education.

Electricity

The cost of electricity per million Btus (MMBtus) was approximately three times higher than No. 2 oil and four times higher than natural gas in 1982. It is the schools' most expensive fuel per Btu and is apt to stay that way. However, the rate of increase in electric costs is expected to level off from its rapid rise in the early 1980s and increase by only 1 percent through 1985. It is then expected to go up over 9 percent from 1985 to 1990, and climb another 15 percent by 2000.

The rate of increase for oil and natural gas is expected to be much greater for the same time period, thus closing the price gap to a degree. Electricity is expected to increase 27 percent from 1982 to 2000; No.2 oil, 54 percent; and natural gas, 80 percent. At this rate, electricity would be about two times as expensive as No.2 oil and three times as expensive as natural gas by 2000.*

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*The cost relationships are drawn from the Department of Energy report, "Energy Projections to the Year 2010," and DOE uses source Btus (11,600/kWh) in its calculations. If site Btus (3413/kWh) were used, the cost relationships to other fuels would be much closer. The projected rate of increase applies in either case.

Using the DOE projected costs for electricity per MMBtu shown in Table 9 and applying the percent of increase to the mid-point in the 1980-81 per pupil energy cost range of $100-$130, future electrical costs can be projected.

When school people project the funds necessary for certain budget line items, they do not attempt to differentiate between increased costs due to product price changes and those due to inflation. Therefore, in order to present a reference base more useful to educational decision makers, calculations for future energy costs include a 6 percent per annum inflation rate. In order to more closely ally the projected utility costs to what the schools might experience, the per pupil costs for lighting and other electrical demands (excluding electric heating and/or cooling) are placed at 15 percent of the energy budget. The base figure used in Table 11 of $17.25 represents 15 percent of the 1980 mid-point per pupil energy costs of $115.

TABLE 11. PER PUPIL ELECTRICAL COSTS AS 15 PERCENT OF TOTAL SCHOOL ENERGY DEMAND

(With 6 percent per annum inflation rate)

Year	Per Pupil Cost	Percent of Increase
1980 (base)	$17.25	
1985	22.62	26.5%
1990	37.65	9.4%
1995	56.25	12.9%
2000	76.41	1.7%

National trends and comparisons are of value, but it is the individual school district that must pay the utility bill. Variations from the above national figures are apt to be significant. For example, schools in the South and Southwest are likely to consume more electricity to meet air conditioning needs. Utilities in the South and Southwest tend to depend more on natural gas for electrical generation. Those higher gas costs will be reflected in the utility bill.

Eventually, the DOE projects that oil and gas will be priced out of most utility markets. The use of oil and gas for electrical generation is expected to drop from the 1980 level of 27 percent to 8 percent by 2000.(28:14) This change in generating supply will prompt plant modifications and/or new construction. The costs for these changes will fall heavily on utilities in the South and Southwest areas.

Financial problems associated with increasing natural gas costs and conversion for the electrical consumer would be exacerbated by the relatively intensive use of electricity in that area. The preponderance of states identified as having unfavorable funding prospects through 2000 are in the South and Southwest. Therefore, the schools in those areas, the very ones that can least afford it, are apt to have the highest increases in utility costs.

Oil

In 1985, the cost of energy per pupil in oil-heated schools, even with a 6 percent inflation factor, is expected to be about what it was in the 1980-81 school year. By 1990, with the same inflation rate calculated in the costs, the costs will be about 50 percent higher. The more rapid escalation of oil prices expected in the 1990s is apt to drive up per pupil energy costs for oil-heated schools to around $470 (with 6 percent per annum inflation factor).

Across the nation only 19 percent of the schools depend on oil for heating. (1) Federal Energy Regions 1, 2, 3, and 10 rely primarily on oil for their heating fuel. The greatest concentration is in New England, where 86 percent of the schools depend on oil for heating. These areas of the country can anticipate a continued respite from higher heating oil costs through the 1980s in constant dollars. But they had best get braced for a rather sharp climb in the 1990s.

Schools with fuel option boilers may take advantage of "soft" oil prices in the immediate future to the extent that local conditions allow "fuel shopping."

Natural Gas

The schools are disproportionately dependent on natural gas as their heating fuel. Natural gas holds approximately 25 percent of the market share. However, more than 60 percent of the nation's schools rely on natural gas as their primary heating fuel. The proportion is even higher in urban settings where 80 percent of the schools depend on natural gas. (AASA Dereg) In certain regions, such as Federal Energy Region 6 (TX, NM, LA, OK, AR), natural gas dependency runs as high as 92 percent. Schools in the South that depend heavily on electricity for air conditioning find that their utilities also rely heavily on natural gas to generate much of their electricity. The projected costs of natural gas are, therefore, particularly important to these schools in their financial planning.

Unfortunately, the political aura surrounding natural gas price projections creates uncertainties. With education's heavy reliance on natural gas, this uncertainty has a crippling effect on long-range energy planning.

For purposes of projected future natural gas costs, the percentage increases in five-year increments derived from the DOE projections cited in Table 8 will be used. The percentages of increase were applied to the mid-point ($115) in the 1980 per pupil energy cost figure. A straight line progression was used in calculating the increases in the intervening years not cited in Table 8. A 6 percent per annum inflationary rate was used. The effect of these calculations on the energy budget for an average school with a gas-fired boiler and a 15 percent electrical demand is presented in Table 12.

TABLE 12. PER PUPIL ENERGY COST PROJECTIONS IN SCHOOLS WITH GAS-FIRED BOILERS AND 15 PERCENT ELECTRICAL DEMAND
(with a 6 percent per annum inflationary rate)

Year	Electricity	Gas	Total
1980 (base)	$17	$ 98	$115
1985	23	205	228
1990	38	297	335
1995	56	465	521
2000	76	800	876

To put future natural gas costs in another context, the DOE mid-range figure for 1985 is $5.61 per mcf (in 1982 dollars). Using DOE forecasts and the 6 percent inflation rate, natural gas would be approaching $10 per mcf by the end of the decade and would be just under $40 per mcf by 2000.

Natural gas prices have the fastest projected rate of increase of any energy source--about 80 percent from 1982 to 2000. The implications are significant since the majority of the nation's schools rely on natural gas for heating. Through 2000, the nation's schools can expect to shoulder a disproportionate burden of increasing energy costs.

When the needs and potential revenues of the educational community are further analyzed, it becomes evident that those states and school systems that can least afford it have an even higher incidence of natural gas dependency.

States. Those states depicted in Figure 2 as having an "unfavorable" prognosis for meeting the educational needs of their elementary and secondary students are apt also to have a higher percentage of schools dependent on natural gas. Table 13 and Figure 12 illustrate this dual problem.

For example, a review of Table 13 reveals that 84 percent of the states designated as having "unfavorable" funding prospects have 71.7 percent of their schools relying on natural gas.

FIGURE 12. STATES WITH UNFAVORABLE EDUCATION FUNDING PROSPECTS AND A HIGH PERCENTAGE OF SCHOOLS RELYING ON NATURAL GAS

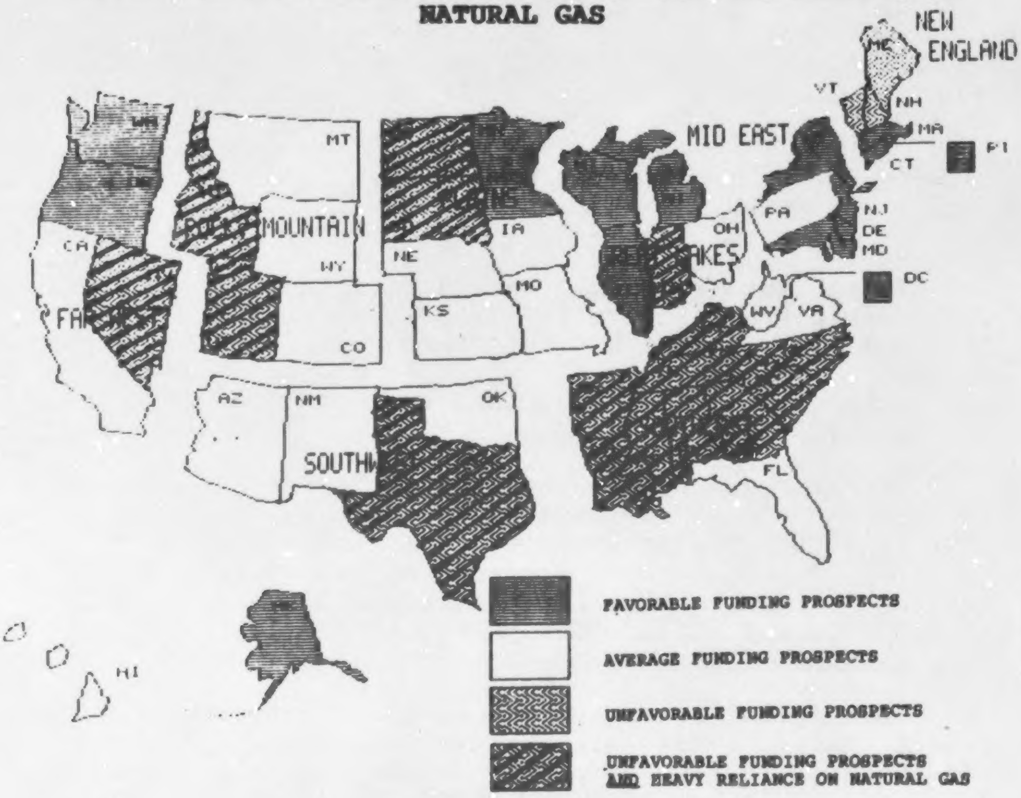
NEW ENGLAND
ME
VT
NH
MA
RI
CT
MID EAST
PA
NJ
DE
MD
DC
WA
MT
MOUNTAIN
WY
CA
FA
CO
NE
IA
MO
KS
OH
AKES
WV
VA
AZ
NM
OK
SOUTHW
FL
HI
FAVORABLE FUNDING PROSPECTS
AVERAGE FUNDING PROSPECTS
UNFAVORABLE FUNDING PROSPECTS
UNFAVORABLE FUNDING PROSPECTS AND HEAVY RELIANCE ON NATURAL GAS

Table 13 lists those states identified as having unfavorable educational funding prospects and the respective percentage of schools that rely on natural gas.

TABLE 13. STATES WITH UNFAVORABLE FUNDING PROSPECTS AND PERCENTAGE OF SCHOOLS WHICH RELY ON NATURAL GAS

State	Percentage of Schools in State Using Natural Gas
Alabama	69
Arkansas	69
Georgia	69
Idaho	78
Indiana	67
Kentucky	69
Louisiana	69
Maine	(12)*
Mississippi	69
Nevada	78
New Hampshire	(12)
North Carolina	69
North Dakota	75
South Carolina	69
South Dakota	75
Tennessee	69
Texas	79
Utah	75
Vermont	(12)

All unfavorable states $\bar{x}$ (%) = 62.3
Unfavorable states
excluding New England $\bar{x}$)%) = 71.7

Source: School Finance Project
AASA Energy Use Study, 1980; regional averages
*Percentages shown in parentheses ( ) designated New England and not included in second mean percentage figure

A review of Table 13 reveals that 84 percent of the states designated as having "unfavorable" funding prospects have 71.7 percent of their schools relying on natural gas. Those states scheduled to experience the greatest educational burden will carry the greatest energy cost burden as well.

Urban School Systems. Cities are becoming poorer as measured by per capita income. Urban income is declining relative to states' average income. In its study of urban school systems, "The Financing of Urban Public Schools: A Report on Selected School Systems," the School Finance Project concluded, "Urban school systems...are increasingly composed of children who are poor and from minority backgrounds. ...central cities have a high incidence of educationally needy children and that their numbers are likely to grow."

What is true of the states is also true of many urban school systems. Four of every five urban schools rely on natural gas for their heating needs--school systems that, as a genre, can least afford higher energy costs. In particular, the School Finance Project identified 13 school systems as having "poor funding prospects" that also have a higher than average reliance on natural gas. Table 14 lists cities with poor prospects along with their relative reliance on natural gas.

TABLE 14. CITIES WITH POOR FUNDING PROSPECTS AND RELATIVE RELIANCE ON NATURAL GAS

City	Natural Gas Reliance Level
Baltimore	Moderate
Birmingham	Very High
Detroit	High
Hartford	Low
Houston	Very High
Kansas City, Kansas	High
Memphis	High
New Orleans	Very High
New York	-0-
Newark	-0-
Tulsa	Very High
Salt Lake City	High
San Antonio	Very High

Sources: School Finance Project; American Association of School Administrators, "Impact of Deregulation on Urban Schools", 1983

With the exception of New York, Newark, and Hartford -- and to some extent Baltimore -- the large cities listed in Table 14 are expected to experience the greatest increases in energy costs. In addition, they are less likely to have the funds needed to convert boilers to other fuel sources.

To compound the problem, school systems that rely on natural gas are apt to find that their utilities rely on the same fuel. In addition, many utilities now relying on natural gas will be forced to change to other fuel sources. Costs for change over or new construction must ultimately be borne by the consumer. To exacerbate the problem even further, 70 percent of the cities identified as having poor school funding prospects have heavy air conditioning needs.

****

A Case in Point: Houston, Texas

Houston is one of the 13 cities cited by the School Finance Project (SFP) as having poor funding prospects to meet the educational needs of its students through 2000. It is located in a state that SFP has characterized as having "unfavorable" funding potential.

One hundred percent of Houston Independent School District's heating needs are met by natural gas.

The school system's electrical needs are served by Houston Lighting and Power (HL&P) which generates approximately 70 percent of its power by natural gas. In the fall of 1982, representatives of HL&P projected that fuel adjusted costs would increase as follows:

1983-1984	11.68 percent
1984-1985	73.22 percent
1985-1986	11.7 percent

The effect over the next three years would be an increase in the fuel adjustment portion of HISD's utility bill by 90 percent.

> HISD has not felt the full burden of recent increased energy costs because its energy management achievements have been significant. For example, though natural gas costs per unit went up 24.6 percent from 1980-81 to 1981-82, actual billing to HISD went up only 12.7 percent. Despite these energy accomplishments, natural gas and electrical costs are apt to make a profound impact in the years ahead on a district that already has been designated has having poor funding prospects to meet its educational needs.

****

The financial problem urban school systems face, particularly those with the poorest funding prospects, probably will be compounded by higher than average increases in energy costs.

The Composite Picture

For a sense of per pupil energy costs on a national basis, a composite school representing the percentage of each fuel used in all of the nation's schools is presented in Table 15.

This composite assumes 15 percent of the energy budget will be used for electrical needs (excluding electricity for heating and cooling). Other major fuels would be used proportionate to their contribution to all heating ventilating and air conditioning (HVAC) needs; e.g., oil at 16 percent, natural gas at 55 percent and electricity for heating/cooling at 14 percent. Table 15 reflects the progressive per pupil energy costs in five-year increments through 2000. As in other tables in this section, the supporting data were derived from Table 8, with straight line progression calculations and 6 percent per annum.

TABLE 15. PER PUPIL ENERGY COST PROJECTIONS; COMPOSITE SCHOOL--FUEL SOURCES PROPORTIONAL TO NATIONAL PERCENTAGE OF USE

(with a 6 percent per annum inflation rate)

Year	Electrical	Heating/Cooling*			Total
		Oil	Natural Gas	Electricity	
1985	$26	$20	$113	$25	$184
1990	38	30	163	37	268
1995	56	55	256	55	422
2000	76	86	440	75	677

*Other fuel sources--propane, coal, butane, diesel, steam--which represent 4.9 percent of the heating/cooling fuels -- do not have sufficiently reliable price projections to be included. They have been disregarded for purposes of projecting these costs.

Based on the known 1982 per pupil energy costs, the projected energy costs from the Department of Energy, and a 6 percent per annum inflation rate, the energy costs per student in 1990 will be $268--provided schools continue to use fuels in the same proportions. The cost of $268 per student would more than double the 1982 figure. Given the same conditions, the costs will be $677 per student by 2000.

Using the Department of Education's projected 1990 public school enrollment figure of 41.267 million (24:44), the cost of energy to the nation's public schools would be $11 billion in 1990. With a projected increase of 12.1 percent enrollment in the 1990s, the $677 per student figure would bring the energy bill for the nation's public schools to $31.3 billion.

SCHOOL ENERGY IMPACT SUMMARY

Energy costs are expected to continue to be a major factor in education's financial difficulties. While oil costs (in constant dollars) are expected to hold their present levels or go lower through 1985, they are expected to start climbing later in the decade. By the year 2000, distillates are expected to be 54 percent above 1982 levels in constant dollars, residuals are expected to climb 74 percent. Electricity is expected to hold through 1985 and then increase by 25 percent through 2000. The greatest increase will be in the fuel used by most schools, natural gas. It is the only major fuel source projected by DOE to increase significantly in the near future--9 percent from 1982 to 1985. Other sources project increases as high as 10 to 11 percent per year in the immediate future. While future natural gas pricing patterns were clouded with uncertainty in 1983 due to speculation regarding potential federal decontrol actions, conservative projections indicate natural gas will be nearly 80 percent higher by 2000.

Since the schools have a disproportionate reliance on natural gas, they are apt to incur a disproportionate increase in their energy costs compared to other sectors of the economy.

At above rates of increase and with an average inflation rate of 6 percent per annum, the nation's public schools' fuel bill by the end of the decade will be more than double the 1982 level. By 2000, energy costs to the nation's schools will be more than five times the 1982 price tag.

These projected national increases, of course, will vary with local conditions. The energy burden is expected to be greatest on schools in the South and Southwest, where natural gas dependency is exceptionally high and electrical usage (from utilities also dependent on natural gas) is heavy. Sixty-three (63) percent of the states identified as having "unfavorable" funding prospects are in the South and Southwest. The greatest energy burden, therefore, is apt to fall on states and their schools whose ability to meet future educational needs is already characterized as unfavorable.

The public schools are the only sector of the economy that cannot pass through higher energy costs in the price of the product, higher tuition or service charges. To pay the fuel bill, public schools must seek more revenues or cut programs and services. The alternative is to reduce energy consumption. Unfortunately, measures to conserve energy cost money, too. Financially hard pressed schools are caught in a vicious downward spiral where escalating energy costs draw down the resources needed to cut energy consumption. Identifying ways to finance energy conservation measures has become a paramount concern.

FINANCING ENERGY CONSERVATION

Schools frequently use more energy than necessary due to scarce capital resources. Traditionally, public schools have relied on bonded indebtedness as a source for capital improvements. This source of capital generally requires voter authority to incur the debt. The reluctance of voters to support public school indebtedness is endemic. In addition, many states have established limits on the institution's borrowing capacity.

Traditional revenue sources remain a viable way for some districts to fund energy conservation measures. However, when local conditions restrict this option, alternative financing procedures may augment or replace local revenues. Matching federal energy grants has proven to be one viable way to augment local resources.

INSTITUTIONAL CONSERVATION PROGRAM

Authorized under the National Energy Conservation Policy Act, Title III, the Institutional Conservation Program (ICP) provides matching funds to schools for energy studies and energy conserving retrofit projects. In hardship cases, the federal match provides as much as 90 percent of the project costs. Sometimes in-kind or contributions may constitute a portion of the institution's match. Under certain carefully controlled conditions, it may be possible to utilize an alternative financing arrangement (such as shared saviangs) in conjunction with an ICP grant. It is incumbent on the school administrators to confirm that such opportunities meet program requirements before moving forward on an assumption that they will. State energy offices or the Institutional Conservation Program Office, U.S. Department of Energy, Washington, D.C., can provide more information on the program.

The federal energy grants program augments local resources in several important ways by providing:

- at least 50 percent of the initial funds for technical assistance audits and/or energy conservation measures;
- a selling point to encourage local revenue support--"For every local dollar, the federal government will match it...;"
- a demonstrable way to increase the retrofit's cost-effectiveness by cutting the payback period at least in half;
- local documentation of the financial benefits that accrue to the district through investing in energy conservation measures; and
- a positive cash flow that yields funds that might be used for educational needs or further energy work.

ALTERNATIVE FINANCING

Alternative financing refers to any source or method of financing other than federal or state education appropriations or local revenues obtained through the normal capital budgeting procedures.

Energy cost control can be developed as part of sound fiscal management. Energy efficiency improvements are increasingly viewed as investments with attractive returns. As a result, outside investors through various financing procedures are making retrofit capital available to school systems and sharing the benefits of reduced energy costs with the schools.

Alternative Financing Opportunities and Cautions

In the face of capital constraints, public school administrators can take an aggressive approach to developing their energy cost savings potential by using alternative financing. Accessing private capital to improve energy efficiency can:

- generate immediate positive cash flow;
- relieve the tax burden of funding from state and local budgets;
- free scarce resources for other educational purposes while preserving the borrowing capacity for other needs;
- capitalize on the opportunity value of district money not diverted to energy investments;
- avoid the costs of delay which could be incurred through higher energy costs and efforts to maintain old inefficient equipment; and
- make use of private sector energy management expertise.

Many aspects of alternative financing are in their formative stages. Some state laws or guidelines may preclude certain financing procedures mentioned below. Financing alternatives have not been fully standardized and few guidelines are available. As in any new field, firms may venture in without sufficient assurance to the district that they will survive.

First, the school administrator should realize that the procedures are set up so that an outside firm will make a profit by investing in energy efficient improvements for the school system. In almost every instance, those same financial benefits could accrue to the district if it had the initial capital available. In considering any alternative financing scheme, the school administrator needs to weigh the cost of the "interest" on the capital, the cost of the expertise, the maintenance benefits offered, the advantages of obtaining capital without incurring greater indebtedness, the opportunity value of the investment capital, and other factors against the costs of securing these resources independently.

If alternative financing seems desirable, the district should seek outside independent consultation before any commitment is made. Consulation sources include state energy offices, workshops on alternative financing, and energy management consulting firms. As with any such agreement, particularly in a relatively new field, cetain precautions are warranted. They include:

- establishing the base year after conducting a low-cost audit to be sure the simple energy conserving operations and maintenance items like caulking doors and windows, reducing lighting, calibrating thermostats have been taken care of;
- determining parameters of comfort levels (the boundaries within which the school district can turn over heating, cooling and lighting control);
- understanding exactly how the formula for determining energy saved and the associated dollar value are calculated and how adjustments in occupancy, functions or climate are treated;
- establishing termination provisions, including a user buy out clause or removal provisions;
- monitoring the energy savings independent of contractor figures by separate periodic checks or individual metering and working through the formulas;
- incorporating performance bonding into the contract provisions; and
- having the school system's lawyer review the contract before signing.

Financing procedures which can make private capital available to improve energy efficiency in public schools include tax-exempt bonds, municipal leasing, cost sharing, shared savings, third party or joint venture, and general energy services contracts.

Tax-exempt Bonds

Though bonding is a more traditional method of school financing, it is given special consideration here since procedures to increase energy efficiency without costing the state or local education agency money can be inaugurated.

The great drawback to traditional bonding procedures is that the bonds increase indebtedness. A governmental body's debt-issuing capacity is a limited resource. If a local or state government is near its prudent debt-carrying capacity, even energy projects with an attractive return on investment may go unfunded.

Given an economically sound project, the annual debt service of the bonds may be less than the savings realized through reduced energy consumption--resulting in an immediate positive cash flow. To make tax-exempt bonds a viable alternative financing procedure, state budgeting procedures may need to be modified to incorporate this investment perspective and place energy conservation tax-exempt bonds outside the regular indebtedness category. The critical element in bond financing of energy projects is to determine how they are secured and their source of repayment. This requires mapping the flow of funds so the debt service payments are traceable to saved energy dollars.

Revenue Bonds

These bonds are generally secured by the anticipated revenues generated by the funded project. The expected positive cash flow from the project secures the bonds and acts as a source for debt service payment. Since energy efficiency projects are designed to cut costs, not generate revenues, they generally don't fit this pattern. However, such a procedure is possible if a private business entity intervenes between the school district and the bonding authority. The system will work if energy savings are sufficient to create a revenue stream large enough to secure the bonds. Large districts may also use this procedure if the project they undertake generates power for sale. Under the Public Utilities Regulatory Policy Act, utilities are required to buy such excess electricity.

The advantage of revenue bonds is that they are "off credit" to the district and do not diminish the institution's borrowing capacity. Furthermore, they usually do not require voter authority to enter into such an arrangement.

Municipal Leasing

In many states, the school district can enter into a municipal leasing agreement. This agreement is often structured like a simple loan. It is, in essence, a lease-purchase agreement.

The procedure is attractive to the lessor because the interest income is tax-exempt. At the end of the lease, ownership of the property passes to the lessee.

Municipal leasing is not generally considered a long-term debt; so concerns regarding voter authority or reduced borrowing capacity are usually not an issue.

School districts generally need to include a clause in the agreement limiting their obligation to make lease payments within any single fiscal period. The statement generally stipulates that the lessee will be obligated to make every effort to secure the funds for lease payments. The clause, however, satisfies the common restriction against multi-year liabilities.

Sound energy projects, where a positive cash flow can be anticipated, help secure the agreement. Energy projects are particularly attractive for municipal leasing, especially if the lease payments are structured to be less than projected energy cost savings.

Third Party Project Financing

This financing procedure is generally limited to large projects, such as cogeneration or major boiler conversions to alternative fuels. The size of the project usually allows only big districts with large central plants to take advantage of this financing scheme.

A private for-profit firm contracts with the institution to design, finance, and construct the project. The firm may even operate the central plant facility or lease the facility to the district. As with municipal leases, most third party transactions need to be ordinary leases, not lease-purchase, in order for the lessor's tax avoidance to be at its maximum. The district also might enter into a long-term contract whereby the private party sells the steam or electricity to the district. In the latter case, if the real property on which the plant is sited belongs to the school district, it is generally leased to the private party. Very often, a third party financing arrangement is handled as a limited partnership.

Cost Sharing

School districts may enter into an arrangement with the energy equipment supplier to pay the cost of the equipment out of the projected savings. The supplier usually takes about 80 percent of the avoided costs until the equipment is paid for. The district enjoys the 20 percent benefit without any capital investment. The clause discussed under municipal leasing is sometimes desirable since it limits the district's obligations and satisfies multi-year liabilities. In other instances, cost sharing is viewed as a lease-purchase agreement and is not treated as an incurred debt.

In this procedure, the district, of course, is limited to buying the equipment from the vendor offering cost sharing arrangements. However, many firms, especially those selling computerized energy management systems, now offer such financing opportunities.

Shared Savings

At the end of 1983, shared savings was used increasingly in the public schools as a means of alternative financing. A private firm audits the building(s) to determine energy savings potential. Using its expertise and its capital, the firm then modifies the building and its equipment to reduce energy consumption. The district and the private firm split the avoided energy costs using a predetermined formula.

At the end of the contract period, the installed equipment may belong to the district. More commonly, the shared savings company retains ownership. If the firm continues to own the equipment at the end of the contract, the company will generally enter into a subsequent agreement with the district, offering a split in the costs avoided that are more favorable to the district.

General Energy Services Contract

A step beyond shared savings and with some nuances of third party financing is the energy services contract. The company delivers the end product for a fee. The package includes lighting at specified levels, electricity for motors, fans, and conditioned air within specified parameters (thermostat settings) established by the district. Financial arrangements are based on some predetermined service fee plus a penalty factor for any energy consumed over a certain quantity.

The outside firm supplies the energy and assures its most efficient use. The firm usually provides audits, equipment, and site maintenance to help assure the building's energy efficiency. The level of efficiency affects the district's costs and the firm's profits.

The power plant in such an arrangement may be located on private property or on a school site. If it is located on school property, the site may be leased to the company. The financing arrangement is considered a service and is "off list" regarding any debt aspects.

Alternative financing availability reaffirms that energy conservation is good business. It also means that the scarcity of capital should not deter a district from realizing the benefits of improved energy efficiency in its schools.

Educational revenues will remain tight for the foreseeable future, and energy costs to the nation's schools are expected to continue to climb. Managing energy use will become a progressively more attractive, even essential, way to free up dollars in the school budget. Whether energy conservation funds are made available in the traditional way, with federal grants, or through alternative financing, the investment can facilitate sound business practices in the schools.

RECOMMENDATIONS

Based on the findings presented in this report, the following recommendations are presented for consideration.

1. The federal, state and local decision makers should be apprised of the energy costs schools are likely to face in the future, particularly in the 1990s.
2. State energy and education leaders should be made aware of the energy implications for future state education funding. The states, in effect, now pay more than half the local district's utility bill; therefore, their fiscal condition could be enhanced by exercising leadership in improved school energy efficiency.
3. The school administrators should be encouraged to:
    a) reassess energy conservation operations and maintenance opportunities through audits or re-audits;
    b) investigate and initiate economically feasible energy conservation measures with resources available;
    c) conduct long-range planning regarding fuel option possibilities; and
    d) consider energy efficiency and appropriate energy sources in new construction.
4. An in-depth analysis should be undertaken as to the ramifications of increased energy costs for those states and cities the Department of Education has

identified as having unfavorable funding prospects in order to more carefully pinpoint their energy/financial needs.

5. Aggressive national leadership should be exerted to guide the development of alternative financing for public schools by:

   a) identifying state and/or legal barriers to alternative financing,

   b) providing model language to change state laws which impede alternative financing,

   c) providing guidelines for alternative financing procedures,

   d) providing model alternative financing contracts,

   e) holding conferences for appropriate state officials to make them aware of the opportunities in alternative financing as well as the problems, and

   f) holding conferences for school administrators to acquaint them with the opportunities, procedures, and cautions related to alternative financing.

If the DOE projections and the inflation rate cited in this report are realized, the schools have grim years ahead. Action now could stave off some of the energy-associated financial trauma hanging like a cloud over the future of American education.

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